

Managing Editor.—K. M. BANERJEE.

INDUSTRY

A JOURNAL OF TECHNOLOGY HANDICRAFTS & COMMERCE.

VOL. XVII.

NOS. 193-204.

Industry need not wish--Benjamin Franklin.

Industry has annexed thereto the fairest fruits and the richest rewards.
--Barrow.

Faithful, active industry is a living hymn of praise, a never failing source of happiness. --Mme de Wald

The great end of all human industry is the attainment of happiness.
--Hume

In the ordinary business of life, industry can do anything which genius can do, and very many things which it cannot. -- Henry Ward Beecher.

From April 1926 to March 1927.

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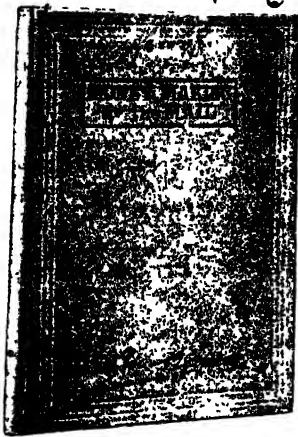
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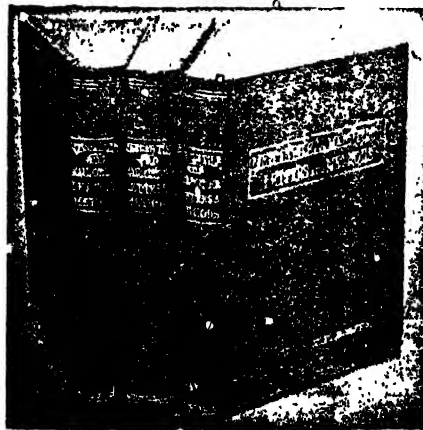
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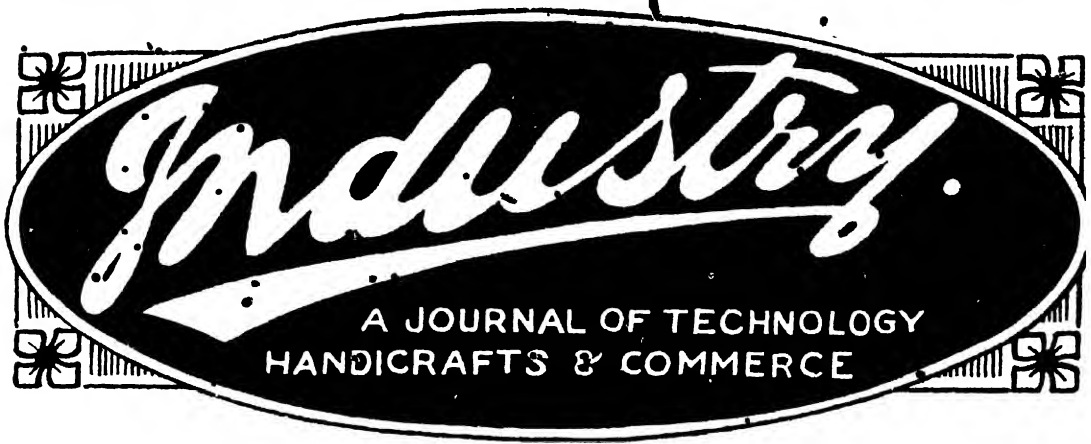
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THE NEW LIGHT IS--CO-OPERATION.

INDIA is hankering after new light a new life. India that is divided against itself, where quarrels between communities and races are moving the amity of the people, where insanitation and diseases are decimating the population and emasculating them day by day, month by month, year in year out; a new light, a new life, a new way of rejuvenation is in demand raising her to her own national glory.

The races and peoples of India have their differences. Every nation on the face of the earth has its. But these differences have enriched life everywhere because they evolved harmony out of them. We find other nations are great inspite of these differences and drawbacks—yes they are great because we are on our knees; let us rise up.

But to rise up we must have new idea for progress—that idea is co-operation. It is not indeed new, nor the people of this country uninitiated to it. The idea of co-operation has its seed grown and developed in our soil in the

right oriental fashion and nurtured by our family system where different limbs of our family from time immemorial are initiated to the culture of co-operation for the benefit of the whole family, and by our village system where every department of our village life cultured a wider field of co-operation for the common benefit of the village. Everyone in the family system and in the village system had a definite place in the co-operative life, in the co-operative culture, in the co-operative interdependence upon each other.

The western system of statecraft has brought with it in this country chaos in the amity of life and before our people realised the situation they were overwhelmed by its new glare which imposed a new division on the people completely separating the illiterate labour from the benevolent guidance of the intelligentsia. This is the new situation where co-operation is in greatest demand. When there was co-operation between the intelligentsia of the country—the brain which

guides every work in an organisation, and the limbs that work, the progress of the country was uninterrupted: the system of mass education was developed to an extent beyond the expectation of the most sanguine exponent of mass education of to-day, organisation of industries and trade had the widest ramifications in all the countries of the world as it was then known. Development of the principles of sanitation was of such higher order that even now we cannot do away with the then established rules in spite of our vaunted extension of knowledge. On all sides of human activities,—moral, physical, intellectual, even religious,—culture in India was of a very high order.

But the development had a set-back—possibly two thousand years ago—since the delusion had dawned on us that we could advance individually and by crushing others. It was a life's great mistake. Time is now on us that we must do everything to rectify it. The higher classes commenced by crushing the lower ones in the society. Gradually separate classes arose—the higher ones were left bereft of the working help of the lower ones and the latter bereft of the intelligence and guidance of the former. The old village organisation became disjointed, the educated ones considered themselves of higher grade and the working classes who were the mainstay of the society were left to see for themselves. Centuries after centuries

the feeling of estrangement took root in our soil, developed offshoots into our midst throwing all feelings of amity and co-operative fellowship away from us. And the result is the disintegration, the disunion between the classes and the masses, between the leaders in society and the followers, between members of the same family. All culture has stopped, all progress in material and moral life is set back and everywhere co-operation is in demand but no one finding out where it will be applied, how it will generate.

And this difference in life is, not going to subside unless bright ideas of co-operation and progress are put before the people in shining success. Let our men of letters join hands, let our less advanced countrymen be brought into the fold to form into co-operative community for the production of food and wealth. Let nuclei be formed with small numbers of enthusiasts, and let them by their honest efforts extend their field of work for the benefit of their fellow countrymen who will follow their examples and benefit themselves by solving their own food problem.

Opportunities are awaiting you, the situation in the country is demanding your immediate activity. Co-operation between the head and the limb, the leader and the worker, for the betterment of both is of imperative need. There must be obstacles no doubt. But they are incentives in the march of progress.

INDIAN CO-OPERATIVE MOVEMENT.

Co-operation, in Theory and Practice.

CO-OPERATION is a term used particularly both for a theory of life, and for a system of business, with the general sense of "working together." In its narrowest usage it means a combination of individuals to economize by buying in common, or increase their profits by selling in common. In its widest usage it means the creed that life may be best ordered not by the competition of individuals, where each seeks the interest of himself and his family, but by mutual help; by each individual consciously striving for the good of the social body of which he forms part, and the social body in return caring for each individual: "each for all, and all for each" is its accepted motto. Thus it proposes to replace among rational and moral beings the struggle for existence by voluntary combination for life.

• MEANING OF CO-OPERATION.

Co-operation is the union of honest men, who feel a common economic need, in order to attain economic relief by joint effort through honest means. The union is voluntary as distinguished from that of a family or caste, and should be based on mutual knowledge and a spirit of equality. In combination poor men may command capital, credit, technical advice, and commercial attention: disunited they are helpless. More particularly is this true of those occupations such as agriculture or cottage industries, in which the workers are often independent in temper, straitened in means, and

living at a distance from one another on a fluctuating income.

THE CO-OPERATIVE SPIRIT.

Co-operation is something more than a system. It is a spirit, an attitude of heart and mind, never more needed than it is to-day. "The conquest of the secrets of nature," says a recent writer speaking of the present condition of the world, "is child's play in comparison with the overcoming of the difficulties of human co-operation." Yet, as in the hour of need men turn instinctively to religion, so now in the hour of economic need men are turning more and more to co-operation, for co-operation is religion applied to business. It is not that business is immoral, but that the capitalist or profit-seeking system which prevails is dominated by the fundamental law of its being, that the maximum profit and nothing but the maximum profit must be earned. No system has ever been more efficient for production or more unequal for distribution. By its very nature it is unable to protect the weak against the strong, the many against the few or the community against the inevitable strife of Labour and Capital. On the other hand it is of the very essence of co-operation to strengthen the weak, protect the community and give fair play to all. Great the task, but fair the prize. To gain it one thing indispensable. Societies innumerable may be founded, vast enterprises may be undertaken, but if the co-operative spirit

is lacking, ultimately all will be as sounding brass or a tinkling cymbal.

FUNCTION OF CO-OPERATION.

The function of co-operation may be examined from two points of view; it may be considered as an immediate economic expedient or as a basis of ultimate social reconstruction. In the former aspect it is a method of mutual organisation by which all persons who suffer from a common economic stress may unite to free themselves from its pressure. In the latter aspect co-operation represents a principle on which a new social world may be so built up as to minimise or render inoffensive the extreme inequalities created by a system of capitalism.

SCOPE OF CO-OPERATION.

Co-operation is, and has been characterised by a great self-reliance, and as regards its individual members its basis is perhaps more essentially 'voluntary' than that of any other organized industrial movement.

The scope of co-operation is the entire field of economic exchange. In final analysis the abstraction of any one part from the continuous cycle of exchange is artificial: no real line of division marks off consumption from production.

SCALE OF CO-OPERATION.

If the scope of co-operation is thus unlimited by any economic quality, it is likewise in theory unlimited in the scale of magnitude: its progress at any moment depends on the capital, the technical and commercial skill, and the political powers which the productive classes, other than the capitalist, manu-

facturer, or enterprising merchant, can bring together.

FORMS OF CO-OPERATION.

The forms which the co-operative movement takes are the outcome of three main forces: the pressure of industrial life, leading to attempts to improve the conditions of employment, and to secure better value for money earned; the exacting conditions of trade and manufacture making it clear, sometimes by success and not infrequently by failure, that real betterment can only be secured by the adoption of sound business methods; and lastly, the spiritual energy, varying in strength, but running more or less through all the responsible leadership of the movement, with its reminder that co-operation will miss its highest mark if the character of its adherents be not raised, and if the heart of man be not touched.

DEPARTMENTS OF CO-OPERATION.

There are four main departments of co-operative efforts.

I. Co-operative Banks.

The co-operative credit society, which exists to supply individual producers with money on good terms, is of two kinds, the town credit bank and the rural credit bank. The first is predominantly an association of industrial producers: the second entirely an association of agricultural producers.

II. Co-operative Agricultural Societies.

The co-operative agricultural society follows next, being structurally similar to and in most cases intimately connected with the co-operative credit society. In both these forms of co-operation, the

members use the co-operative society to assist them as independent productive agents and not to supersede this independence.

III. Co-operative Workers' Society.

It is structurally a capitalistic concern in which there is no employer; for the employees are their own employers, working under a self-appointed manager. The members of a worker's society are not independent producers.

These three are the organisation of co-operation from the standpoint of the producer.

IV. Co-operative Stores.

The co-operative store is organised from the standpoint of the consumer. Its members make their living in occupations with which the store, as such, is not immediately concerned. It does not, therefore, exist to enhance directly the productive effort of its members, but only the income derived from that productive effort.

SUPPLY AND SALE SOCIETIES.

It is now a truism of rural economics that for the small holder co-operation is a necessity. Without it he has to buy all he needs for his industry at retail prices and sell all he produces at wholesale.

CREDIT SOCIETIES.

The structure and methods of co-operative credit societies present more variety and complexity than those of either of the other types, for the handling of the people's money on however small a scale, needs careful adaptation to local circumstances.

From the earliest day of agricultural organisation the need of fluid capital for the farmer has been strongly felt. Many

a sacrifice of crops or stock might have been averted if a little ready money had been forthcoming to tide over the hard times; many a farm might have been bought, stocked, improved and made profitable, if the initial outlay had been rendered possible. So we find that credit societies have made their appearance in most countries very early in the history of the movement. We must also take into consideration the fact that such a society provides the easiest transition from purely philanthropic assistance to a system of organised self-help, so that the original impulse often came, as in the case of Raiffeisen and Schulze, from men whose first interest in the plight of their poorer neighbours was brought about by an instinctive leaning towards charity, which their own modest means made it almost impossible for them to gratify.

Agricultural credit falls naturally into two divisions corresponding to the distinct purposes which we have hinted at above. On the one hand, there is the demand for a fairly large sum repayable over a considerable period, for the purpose of buying, stocking, and equipping land—what may be called initial capital; on the other hand, farmers require comparatively small loans extending over not more than a year to enable them to carry on economically their seasonal operations in the raising of stock and crops—in other words working capital. The former need is met by "real," "mortgage," or "long term" credit, the latter by "personal" or "short term" credit. While in some rare cases the two operations are combined in the functions of one society, experience has

shown that they require different forms of organization, different spheres of operation, and different capacities of management.

CO-OPERATIVE CREDIT.

Co-operative credit institutions are of two classes, according to the occupation of their clients; town or industrial, and rural or agricultural. "

RAIFFEISEN.

A Raiffeisen loan Bank is essentially an association of neighbours. Besides borrowing, it also receives savings deposits, which often produce a large part of, or even all, the capital it needs. In the true Raiffeisen bank the liability of each member is unlimited, but limited liability has been introduced in some of its modifications. The society confines its operations strictly to a small area, where every one knows every one.

Each borrower must specify the purpose for which he wants a loan and this is rigorously inquired into. Only members can borrow. Any member, however poor, can borrow for a profitable approved purpose, and no one, however rich, for any other. Practically all the members see that the money is applied as agreed. Loans are repayable by periodical instalment, but repayments must be made with absolute punctuality.

SCHULZE-DELITZSCH.

In a Schulze-Delitzsch bank, a number of such men combine together to raise a capital of guarantee: to do this every member takes up one share and one only which is of large value, but can be paid up by small instalments. Thus every member is committed to a long

course of saving. On the strength of this capital, in course of formation, and the unlimited liability of the members, the bank is able to borrow, or to receive as savings and deposits from members and others, a much larger capital. The funds so constituted it lends out at the highest rates it can command, varying with the market. It lends to members only, but any amount for any purpose and on any good and sufficient security. The loans, however, are always for a short period.

CRAFTSMEN SOCIETIES.

Craftsmen or Hand-worker societies as they are called, were started in different parts of Germany on Schulze-Delitzsch lines. Almost all the handicrafts are represented: Bakers, Butchers, Grocers, Milkmen, Laundrymen, Barbers, Tobacconists, Hotel-keepers, Watch-makers, Book-binders, Brush-makers, Electrical Instrument makers, Shoe-makers, Tailors, Weavers, Joiners, Carpenters, Turners, Upholsterers, Painters, Window cleaners, Glaziers, Furniture makers, Potters, Tanners, Saddlers, Store cutters Scaffolders, Tinsmiths, Lock and Coppersmiths, Wood and Coal Sellers, Wheelwrights, Rope makers, etc.

All these different occupations have separate societies. They are of two main types which are often combined, namely:—

(a) Supply societies, to provide members with their professional requirements, and

(b) Production societies, which undertake contracts and distribute the work amongst their members who are

paid a fixed wage. A few of these are pure production societies, that is to say, they have a common workshop, but this is a difficult form of co-operation, and in most production societies the member works at home.

CONSUMER'S CO-OPERATION

In tracing co-operation back to its origin there is danger of considering the work in its dictionary sense. Broadly, co-operation means any kind of joint efforts, for good or bad. The kind of co-operation we are considering does not even include every kind of good joint action. The movement is, in fact, unfortunate in its name in that it fails to limit it, or define it.

The specific kind of co-operation here considered has most commonly been called "distributive co-operation," but this gives a wholly erroneous impression, for it is production which has given it its significance. More recently the name "consumer's co-operation" has been applied and this does give a fairly correct impression, distinguishing it from those other forms of joint effort with which it has generally been lumped and with which, in methods, principles, and aims, it has nothing in common.

The aim of co-operation is to enable the workman to work for himself and his fellow co-operators. A means to this end is the erection of stores from which members may purchase all provisions and other necessities. Members will not, however, gain any immediate advantage by so doing, but it will provide a means for the building up of a collective capital, which they will at no

very distant date be able to use in employing their own members.

Co-operation will add to the power of the workers as consumers. If a number of workmen were to join together on these principles, their capital would be greater and they might do great things. They might have store of their own where they might deal in anything they wanted. Their store would enter into competition with other stores in serving the public. As the business increased, the profits and capital would increase. As the capital increased it would employ the members of the society, in any way which might be deemed most advantageous. If there was a profitable demand in the public for any particular commodity, the members might manufacture it. If the profits of manufacture were not high enough to make it worth producing them, the members might easily raise their own food by hiring or purchasing land, and becoming part of them, agriculturists instead of manufacturers.

Viewing the problem from the distributive end the following principles may be laid down. The working class should begin by having stores of their own. These shops should belong to a number who should form themselves into a society for the purpose. They should deal as much as possible with their own shops by which each society would receive the profit upon the run of the shops, which now goes to the shops in general (private stores), by which profit, by which alone, all the rich shopkeepers in the world grow rich and make their fortunes. We say it is this

profit alone which maintains the splendour of the merchants and companies of the world.

The working classes have the strongest possible motives for opening shops for themselves. The sum of money which the working classes spend each year is enormous. The profit on this sum would of itself be sufficient to establish many manufactories. It is not the want of power, but their want of knowledge, which prevents their making a beginning.

INDUSTRIAL CO-OPERATION.

Industrial co-operation is found in many forms, and in many degrees of completeness. The working class "Store," the "Productive" workshop or factory, the "Profit-sharing" Joint Stock Company or private firm, the varieties of associated enterprise in agriculture are among its numerous types. Most of them could be again subdivided, and it would be useless to attempt to describe them all by any single formula. Constitution, financial basis, aim—all vary, and in consequence the part that they play alike in the co-operative movement itself, and in the industrial life of the nation.

The wider diffusion of profits, the maintenance of industrial peace, increased "efficiency," the strengthening of a threatened industry of prime national importance are among the ideas that are apt to assume special prominence in connection with one or another of these different co-operative forms, and thus while the significance of all may be included under some such general national aim as that of "increasing eco-

nomic and social well-being," no narrower statement would suffice.

WORKERS' SOCIETY.

The society of working men producers or workers' society is a unique form of co-operation. Other forms bring together hitherto isolated agents in an organisation which increases the effectiveness of individual action, whether in the production or consumption of goods, and which by rendering services that were formerly neglected or inadequately executed by third parties secures a distinct advance in business methods. The workers' society on the other hand offers an alternative to the normal type of non-co-operative industry, which, from a business point of view, achieves business success. It does not claim that it has a general economic superiority, but rather that, in the fields of industry congenial to it, it is capable of holding its own; and that, where it is financially successful, it has also dignified and strengthened the position of the workers by introducing them to the brain work of management and responsibility. Consequently, while other forms of co-operation can show the restless triumph of union over isolation, the workers' society can only show the gallant attempts of working men to achieve higher things. Other forms of co-operation provide machinery which can be used by the great as well as by the small. The large farmer can sell his produce through the store in the same way as a factory hand. None, however, but working men can form a workers' society, since this is an alternative, which working men seek, to their position as ordinary employees.

Co-operation in Foreign Lands.**HOLLAND.**

In Holland the co-operative movement may be regarded from two points of view; firstly as a part of the national economy; secondly, as an element in the national spirit. In the former relations are to be considered the business efficiency of the larger co-operative organs, their connection with the State, and their utility in enhancing the income of the country, freeing trade from needless middlemen, and raising the value and the reputation of the country's products. In the latter aspect co-operation is a spiritual influence: it creates, or is intended to create, a sense of harmony and unity, a tolerance of divergent opinions and an intolerance of waste, a consciousness of individual freedom and worth.

Though the co-operative idea in Holland is of late growth, the success that has attended co-operation may be summarised as follows. The money lender has no longer his old power: trade rings are broken: the dairy farmer may in nearly all areas expect to receive a fair price for his product: in return he must deliver the product pure and of a stated quality. The farmer as well as the trader is taught the important lesson that honesty pays. There appears nevertheless to be room for progress in the fields of co-operative sale, other than of dairy products, and of insurance. The farmer and the town-consumer can only join hands when they replace the factory owner. The tendency in all industrialized countries at present is towards the control of manufacture by the associated

consumers; the farmer or other first producer has advanced more slowly. But it is not desirable at all events under the existing social system, that either consumer or producer should dominate over the other. The producer also must expand his activity in the sphere of transport, manufacture and wholesale dealing.

BELGIUM.

The origin of co-operation in Belgium is to be sought as much in the teachings of Fourier as in the school of Owen. There the spirit of independent effort has always provoked the growth of scattered societies for production, purchase, or miscellaneous services. The organisation in consequence, which survive and occupy a prominent place, are those of which the strength and durability are derived from other than purely economic sources. The principal co-operative structures of Belgium must, therefore, rest on a political or religious basis; in the second line stand a series of minor bodies, comparatively weak and ill-organised.

ITALY.

The peculiarities of co-operation in Italy spring from the physical nature of the country and are also an inheritance from her chequered history. In conditions of penury and disorganisation of the people, is to be sought the origin of the three characteristics of Italian co-operation. Until the pressure of the war led to a policy of unification, it was provincial and incoherent. It also represents not only, as in England, a struggle of the artisan against the manufacturer and the shop-keeper, but still more notably

a determination of the labourer to free himself from dependence upon the contractor or the land-owner for his livelihood. Finally assistance has been freely given by the State, the savings of the poor being inadequate for the great aims which they held in view.

JAPAN.

Co-operation is of very old standing in Japan, and is much appreciated and freely practised. The most ancient form known is that for the co-operative sale of silk. Some of the societies of this type, still flourishing, can trace back their history for 240 years. Another peculiar form of co-operation dates from the third decade of the 19th century. It is the creation of a distinguished economist, and philanthropist. There is a striking resemblance between some of these purely Japanese societies and those formed by Raiffeisen.

Thus they place social and moral good above economic benefits. They make it their aim to help the very poor, placing merit and honesty, also good employment of the loan, above material security. They forbid salaried service, laying it down that social work should not be remunerated. They also grant loans for long periods, five, seven, and ten years. They attach the utmost importance to thrift, inasmuch as they compel their members to save from their incomes. Good conduct is an essential condition of membership.

FRANCE.

In France, as in other countries, milk is the grand object of co-operation. The societies are of one of three kinds,

according as they are concerned with cheese-making, butter-making or the sale of milk direct. The different uses of milk are in a measure determined respectively by the percentage of casein or butter fat in the milk, or by the proximity to large towns.

IRELAND.

Nothing could be more hopeful for the triumph over the mind of men of spiritual ideas than a movement which aims at superseding individualism in the economic sphere by co-operation in Ireland. The co-operative movement in large measure binds together the economic interests of Irishmen, so that purchase, manufacture and sale become less and less personal enterprises and more and more communal or national activities. It illustrates in a practical way the truth that the personal and economic interests of the majority are served best by their incorporation in communal enterprises. So the mind of the citizen is pre-disposed to subordinate his own interests and to identify them with the interests of the nation. Whatever may be the temporary strength of other movements in Ireland the co-operative movement dealing as it does with the daily lives of men must finally have an influence greater than any other in its effect upon the character of the Irish nation. It occupies itself with things men must do under whatever Government they exist, whatever cultural interest they may have; and because it deals with the permanent human occupations, the principles accepted in its organisation must affect rational character in the long run most powerfully

SWITZERLAND.

Switzerland is the home of cattle-rearing societies the objects of which are generally as follows:

(1) the selection and proper maintenance of the best bulls;

(2) the selection and marking of the best cows and heifers;

(3) the systematic maintenance of animals for breeding purpose, and the proper rearing of their calves;

(4) the regular keeping of a 'herd book' with correct particulars as to the pedigree of animals;

(5) enquiry as to the capacity of productions;

(6) the encouragement and facilitation of the sale of cattle for breeding purposes, and the protection of the interests involved;

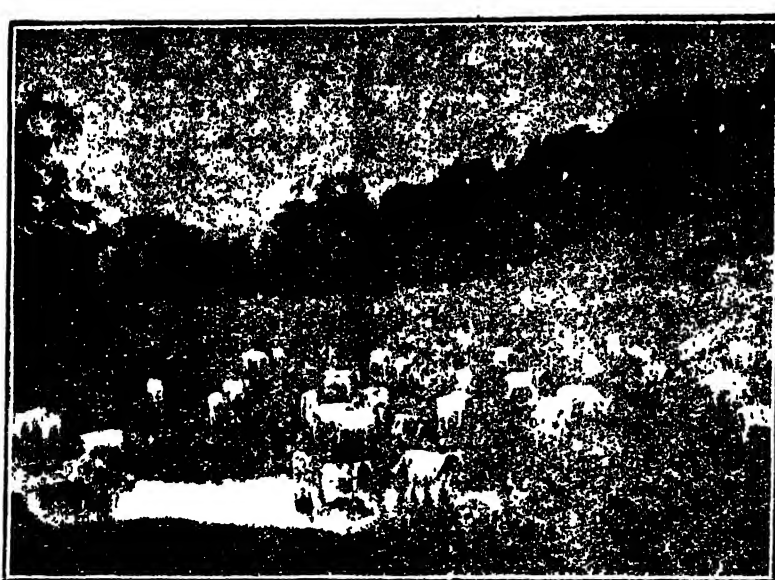
(7) the exchange of information among the members of the society as to question of breeding and feeding.

Co-operation in India.**THE CO-OPERATIVE MOVEMENT.**

One of the greatest, albeit the quietest, movement in India to-day and the movement with the greatest future before it, is the co-operative movement. In less than two decades fifty thousand societies have come into existence and the adherents of the movement, must be approaching two millions, practically everyone of whom represents a family.

At the time of its inauguration the chief object of co-operation in India was to deal with the stagnation of the poorer classes, and more especially of the agriculturists who constitute the bulk of the population. It was found in many parts

of India, as in most European countries, that in spite of the rapid growth of commerce and improvements in communications, the economic condition of the peasants had not been progressing as it should have done, that indebtedness instead of decreasing had tended to increase, that usury was still rampant, that agricultural methods had not improved, and that the old unsatisfactory features of a backward rural economy seemed destined persistently to remain. The more obvious features of the situation presented themselves in the form of usury and land-grabbing on the part of the money-lending classes, while the agricultural classes either hoarded their savings or owing to thriftlessness and indebtedness showed themselves unable to withstand bad seasons and to meet organised trade on equal terms. The depression of the rural classes was further characterised by an underlying absence of any desire for education or advancement and a certain resigned acceptance of oppression from those who by wealth or social position occupied a superior position, an attitude which, though often spoken of as 'conservative,' has frequently little of intentional conservatism about it, but is due rather to ignorance, to a traditional subservience in the past, and to an absence of ideals for the future. The peculiar feature of co-operation as a remedy for stagnation is that it is intended to meet not only the more obvious material evils but also the underlying moral deterioration to which the poorer classes have so long been exposed.



Grazing Ground attached to a Farm.

The stagnation of the agricultural classes in the greater part of the country has for many years attracted the attention of the Government and various remedies have been tried for improving their material condition.

After previously attempting many remedial measures the Government turned to co-operation as the most hopeful method of dealing with the problem before it.

TYPES OF INDIAN CO-OPERATION.

The principal forms of non-credit business in which co-operation has been employed in India have been classified under five heads; (1) purchase or purchase and sale, (2) production, (3) production and sale, (4) insurance, and (5) others. Of these the most important are production and sale and insurance.

The practice of combining for the mutual supply of money had been in

existence as an indigenous institution in parts of India long before the introduction of co-operative legislation. One of the oldest instances of such combination is to be found in the *chit-fund* system which is met with chiefly in the Malabar and Tinnevely districts in the Madras Presidency. A development of the above system is the Loan Fund known as *Nidhis* which exist in various parts of South India.

THE LESSON FOR INDIA.

The forms of co-operative activity that have proved most popular and successful in England are those connected with purchase, production, and distribution. But in most Continental countries these branches of work were not undertaken until credit societies had been firmly established and development in India has followed the Continental precedent. Credit Societies with their

simple organisation and methods of management afforded the easier field in which the principles of co-operation could be learnt and practised, and were therefore first pressed forward.

NON-AGRICULTURAL • NON-CREDIT SOCIETIES.

Of the non-agricultural non-credit societies the most prominent and the most promising are those formed for the benefit of weavers. The object is to purchase wholesale raw material, yarn and silk, to help weavers to buy improved looms and other implements, and to organise the direct sale to consumers. Successful attempts have been made to arrange for the purchase of cane for basket-workers, timber for carpenters, and implements (sometimes of improved pattern) for several industries.

Among agricultural societies for purposes other than credit, the outstanding types are those for the sale of produce, and for cattle insurance. The former are at present chiefly found in Burma and combine with credit business the sale of paddy and groundnuts on behalf of the members, direct to wholesale dealers at Rangoon.

NON-AGRICULTURAL CREDIT SOCIETIES.

In introducing the co-operative credit movement into India the Government ordered that the establishment of societies among the agricultural classes should be the first care of local Governments, giving as their reason that "the agricultural problem is more serious and far more difficult to deal with than the industrial problem, and it is necessary that effort should be concentrated."

URBAN SOCIETIES.

Urban societies, composed mainly of members of the middle classes, are frequently defective in that they are not really co-operative. Shares are often taken up merely for the sake of dividends and money is not infrequently borrowed for speculative enterprises. Their value consists not so much in their services to co-operation as in the training ground they afford to their members for understanding ordinary joint-stock banking.

AGRICULTURAL CREDIT SOCIETIES.

The agricultural credit societies now established in India are for the most part composed of peasant owners or tenants.

MORTGAGE BANKS.

There is no economic problem more vital to India's prosperity than the transformation of her mortgage debt from a burden into a source of strength. Mortgage debt is only to be feared if it is unproductive or dear. In India it is both. It is, therefore, a millstone round her neck instead of being, as in Germany, the foundation of her development.

Germany is the model country for co-operative credit, and in Germany the co-operative credit association has been the parent of every other form of co-operation.

CO-OPERATION IN AGRICULTURE.

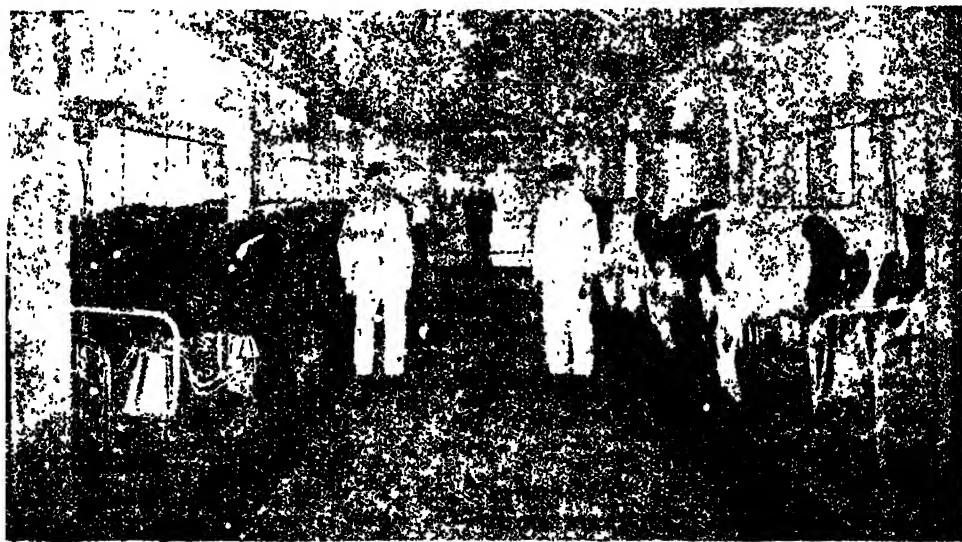
The study of agricultural credit includes the study of the whole of agricultural organization. Credit signifies one or two definite structures, and agriculture, where it needs co-operative credit, adopts a fairly constant type. The processes of agricultural production, how-

ever, depend upon environment, and such things as bad communications, climate, religious prejudices, the state of general education, and narrowness of outlook, impose natural limitations upon the immediate scope for co-operative action. The rate of co-operative progress cannot be forced, for the movement cannot run ahead of the general development of the country and of the people in it, though, of course, it can and does greatly stimulate that development. The successful practice of co-operation in agriculture postulates, on the part of the cultivating classes, an ingrained appreciation of the value of association which only years of patient work can instil. Of the many different kinds of sale society in Germany there is none so remarkable as the co-operative granary. The granary society is one which buys and sells grain and is equipped with facilities for storage.

GRAIN BANKS OR DHARMAGOLAS.

The advantages of a grain bank in India have been thus summarised.

- (1) A *Dharmagola* can be established in each village from its own resources.
- (2) The contribution of each individual being only a small portion of the annual yield of paddy is not likely to cause any hardship.
- (3) The cost of its up-keep will not be heavy as the posts of the *Punchayets* other than the *Goladar* will be honorary. Fit men for the management of the banks will be always available in the village.
- (4) There will be no scope for excessive borrowing from such banks, as there may be in the case of money banks.
- (5) On the accumulation of a stock of paddy in the *Dharmagolas* old paddy will be exchanged for new paddy



Machine-Milking in Foreign Dairy.

securing a profit and preventing sickness that is caused from the consumption of new rice.

(6) The *Dharmagolas*, by supplying grain for food to the cultivators in want, would allow them to fetch better prices for their crops.

(7) The *Dharmagolas* being the public property of the village, and no one having any right to sell the stock, a reserve stock of grain will ever remain in the country.

(8) The *Dharmagola*, if established all over the country, will not only benefit the agricultural classes, but also the Zemindars and the Government as it will relieve them of the necessity of making contributions for assisting the people during famine and scarcity.

(9) The initiative being taken by the villagers, and the *Punchyaets* being appointed by them they will take a special interest in these *Dharmagolas* and will try by all means to maintain them on an efficient basis.

(10) During times of scarcity a formidable difficulty presents itself in transport of grain to villages which have no railway or steamer communication. The establishment of these banks will solve the difficulty.

CO-OPERATION IN FARMING.

The co-operative farm is Italy's special contribution to agricultural co-operation. Its importance lies in the fact that, whereas other co-operative forms, such as supply, sale and credit, only deal with the means or the results of production, the farm deals with production itself. It, therefore, touches

agriculture at its root whether it can be introduced into India, as it is now being introduced into Ireland, Serbia and Germany, may possibly be doubted, but the experiment should be tried.

It should be evident that the individualistic farm has considerable possibilities, and that there is almost no section of the agricultural community which it cannot serve in one form or another. It is the only kind of society that would be a better foundation for a rural co-operative system than the village bank. To the tenant its advantage is obvious, and to the proprietor, too, large as well as small, it has a message. To the small, it is the message of better farming. From a good co-operative farm he will get the skilled teaching and guidance that nearly every peasant farmer still needs the whole world wide and in addition he will enjoy facilities of supply and sale denied to others. To the large proprietor the co-operative farm is a reminder that the landlord can no longer be considered as a proud and inaccessible deity, to be served by his dependents with reverence mixed with fear.

FISHERIES.

The following practical suggestions have been made on the improvement of fish supply in Bengal by co-operation. If the swamps, hollows and pits by the side of the railways are taken over by fishermen's co-operative societies and re-excavated into tank-fisheries the triple problem of fish supply, water-supply and prevention of malaria would be solved. Such fisheries, it is pointed out, would

(1) Supply an indigenous, nitro-

genous and wholesome animal food which is necessary for the health and strength of the people;

(2) Supply incidentally the want of pure drinking water; and

(3) Destroy Malarial mosquitoes.

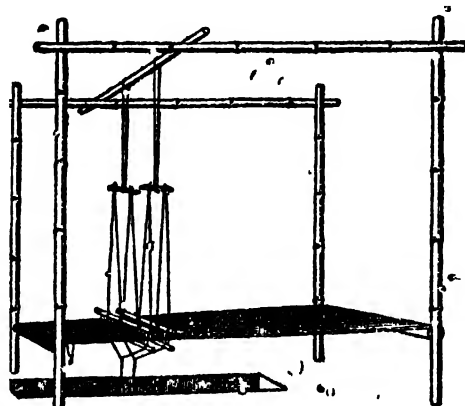
CO-OPERATIVE DAIRYING

As in the case of so many other countries, it is probable that dairy-farming in India will also gain most from the application of co-operative principles, because it is here that not only is there considerable scope for improvements in the purely farming process involved, and for economies in transport, and in marketing, but it is also here that modern invention gives greatest scope for the transition from the home to the factory system of production—from the "small" to the "large"—a transition in which is, perhaps, seen the most distinctively economic feature of the new movement.

A reference to the accompanying pictures will make it clear how a large number of milch cows is cleanly and efficiently milked with up-to-date milking machines and how a big herd of cattle is allowed a wide grazing ground conducive to their health and nourishment.

No article of food is more important than milk, none perhaps is so liable to adulteration and impurity, none ought to be more generally consumed, and none in the interests of the health of the community ought to be more free from suspicion. It is in the supply of this commodity, therefore, that an exceptional opportunity seems to exist at the present time for co-operative enterprise. The economic importance and possible

future of dairy farming is not inconsiderable as it may at first sight appear but in many other directions to which reference has been made the principle of association is probably destined to find far larger, if not more useful scope.



Indian Pit Loom

WEAVERS' SOCIETIES.

The following may be taken as typical of urban society possessing exceptional interest and importance to the social and economic life of the country.

We refer to weavers' societies formed for the purpose of supporting the languishing old industry of handloom weaving. The question has assumed a greater degree of importance in Bombay than in any other province, because the introduction of large cotton mills there is tending to draw into the factories an increasing number of those who have hitherto pursued weaving as a cottage industry. Handloom weavers still form a considerable majority of the weaving population, and it is considered that, if steps are taken in time, they may be preserved from drifting into the ranks of a city proletariat.

Weavers' co-operative societies have generally three objects in view—first, to lend capital for the purchase of raw materials such as yarn, silk, dyes, etc., second, to organize the sale of manufactured goods; and third, to introduce improved appliances suitable to the weavers' needs. For comparison the old type pit loom and the improved flyshuttle loom are shown in the pictures. The societies start by giving cash loans to weavers for necessary expenses and they undertake the joint purchase of yarn at wholesale prices. For this latter purpose a central yarn broker is appointed at the capital of the province. Most of the difficulties of the societies arise from the professional money lender.

CO-OPERATION IN COTTAGE INDUSTRIES.

The importance of preserving cottage industries is two-fold. From the point of view of the community, the survival of such industries has a distinct moral value. Their products are finer, and distinctly more artistic and imaginative. And from the point of view of the workers themselves it is as a rule a clear advantage to them to remain masters of their own labour and not descend to the level of employees in a factory under conditions which destroy self-respect and the virtues. And when the industry is carried on in a village, as is often the case, there is the economic gain to the villagers from possessing an industry of their own.

The functions which can be performed by co-operative societies for the improvement of cottage industries are:—

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(1) Purchase of raw materials in large quantities at wholesale rates; their distribution among the members; and the recovery of their price after the sale of the products.

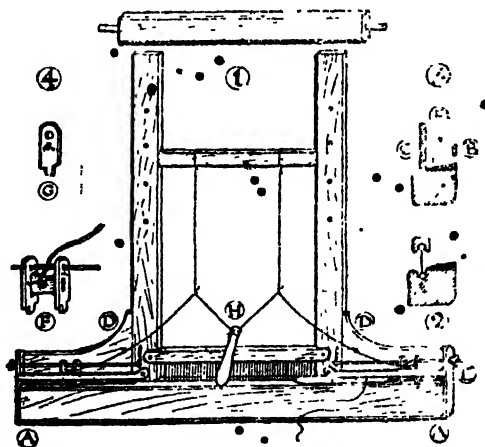
(2) Provision of cash loans at reasonable rates of interest for the purchase of tools or materials, for livelihood during the slack season, and for necessary ceremonial, social and domestic expenses.

(3) The establishment of an agency for the sale of members' products, and during the slack season, for accepting the products in hypothecation, and granting advances against them for further continuance of members' productive activities.

(4) The provision for State aid in the shape of expert advice, technical training and demonstration, exhibition of members' products.

THE CASE FOR THE VILLAGE BANK.

For India the supreme interest of co-operation in Germany lies in the



Improved Hand-loom.

1. Iron Rod. 2. Race-block. 3. Shuttle-box.
4. Picker.

village bank. In both countries it is the dominating co-operative type. In India, indeed, where agricultural credit societies form nearly 90 per cent. of the whole, it is still the only type of importance. By village banks therefore must co-operation in India be judged, and no better standard could be applied than the standard of Germany, which is the birth-place of the village bank and the country of its greatest development. Every one who knows anything at all of agricultural co-operation is familiar with the main features of the system, namely, unlimited liability, an area restricted to a village or two, small shares, limited dividends or no dividends at all, indivisible reserve, loans to members only, low rates of interest and honorary management controlled by the general assembly of members, each of whom has one vote and no more. In detail one country or province may vary from another, but the fundamental principles are everywhere the same, and wherever they are found and however they appear to be derived their ultimate origin is Germany and their sponsors Raiffeisen.

ORGANISATION.

The next subject of importance is organisation. In this field Germany is pre-éminent. When a village society is formed, it is at once affiliated to three co-operative organisations, to a Central Bank for finance, an Agricultural Wholesale Society for supplies, and to the local provincial Union for audit, inspection and control. In its turn the Union, with a few exceptions is affiliated to a National Federation at Berlin. At Berlin there

are two rival institutions—the Raiffeisen Federation and the Imperial.

CENTRAL AND STATE BANKS.

It is a natural transition from Federations to Central Banks, for control and finance are the alpha and omega of Co-operative organisation. This is especially true of agricultural co-operation, for the agriculturist, is the world's greatest producer, and credit is the basis of production. A good banking system is therefore essential, and this system to be sound must be co-operative. Joint stock banks do not answer the purpose for their aim is profit not service. No large country has so fine a co-operative banking system as Germany.

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STATISTICS OF CO-OPERATIVE SOCIETIES, 1923-24.

For the whole of India.	Number of Societies	Numbers of Members.
Central (including Provincial and Central Banks and Banking Unions.)	530	166,585
Supervising and Guaranteeing Unions (including Re-insurance Societies.)	1402	28,728
Agricultural (including Cattle Insurance Societies.)	54645	1,774,914
Non-agricultural	4529	538,654
Total number (Primary Societies)	61106	2,313,567

**WORKING CAPITAL OF CO-OPERATIVE SOCIETIES,
FOR 1923-24.**

	In Rs. 1,000.
Share Capital Paid Up	57293
Loans and deposits held at the end of the year from Members.	29382
Loans and deposits held at the end of the year from Societies.	18522
Loans and deposits held at the end of the year from Provincial or Central Banks	135213
Loans and deposits held at the end of the year from Government.	7375
Loans and deposits held at the end of the year from Non-members and other sources.	121887
Reserve and other Funds	35625
Total.	405297

Agricultural Co-operation.

[In the following informative article, the writer points out what Co operation has achieved in Denmark and what it can do in India.]

GENERAL.

MAN is naturally weak in physique and the population has increased so much that Nature left to itself can hardly provide him with food. Single-handed he could do but little, but he is gifted with a superior intelligence which helps him to unite with his fellows, make a common cause and overcome the obstacles placed in his way. This is "Co-operation." Co-operation is the order of the day. In our scramble for existence, especially in a country which is mostly dependent upon the product of the soil, co-operation is absolutely necessary and the want of it means defeat and death. Civilisation is the result of co-operation and the more we are advancing the more we are getting dependent upon the help of others for the smooth working of life. Co-operation is all the more needed in an agricultural country like India, and the lack of it has brought us to our present helpless and deplorable state.

'DENMARK' & INDIA.

Like India Denmark is an agricultural country. About 60 per cent. of the Danish people and 72 per cent. of the people in India have agriculture as their main industry.

The condition of Denmark 75 years ago was what is exactly our present condition to-day. Disunited, helpless and discontented the Danish people were

perhaps the foremost nation in the world, who brought about their salvation by this method of co-operation. The State helped the people whole-heartedly in extricating themselves from the difficult situation. The Grund Law of 1849 paved the way for future progress. The first co-operative concern (Dairy) was started in 1882. The other co-operative unions and societies followed, the most important ones being the Live-Stock Breeding and Control Unions, the Unions for Joint-Purchase of Agricultural Requirements and for Joint Manufacture, Local Sale and Export of Agricultural Produce.

MANAGEMENT OF CO-OPERATIVE CONCERNS.

The co-operative concerns are managed entirely by the agriculturists themselves, the cottager owning a small farm with only one cow having an equal vote with the biggest farmer owning innumerable cows and other livestock. The Danish people are very highly cultured. Every one of them is literate and many of them are conversant with more than one language. The peasant is much enlightened and advanced in his methods. Education, co-operation and Government help to small farmers lay the foundation of the farmer's prosperity. They are well up in scientific methods of agriculture, and are financially well off. The peasantry possess excellent dwelling-houses of brick or stone, excellent agricultural machinery and plant and live-stock. They are generally well-to-do, in excellent physique and

neat clothes. They are free from the extremes of poverty and riches. The thriving industry of the peasant farmer is quite astonishing. He is able to bring up a large educated family and live comfortably on 7 or 8 acres of land by keeping 2 cows, many poultry and some pigs. There is no sign of poverty among the Danes, and the country always presents a smiling, charming appearance.

The most interesting feature in every form of co-operation in Denmark is the extraordinary fidelity universally observed towards their own institution by the people who participate in them. A member of a Danish co-operative society deliberately violating the rules would have certainly a very uncomfortable time of it in his district. It is really astonishing to find extremely few cases of expulsion of members because of fraud perpetrated upon their society. In this way co-operation has materially assisted in the development of the Danish character.

GROUND-LAW OF DENMARK.

There are 3 classes of holdings and mainly 2 classes of tenures. (1) Small holdings vary from 6 to 12 acres (2) Ordinary farms about 100 acres and (3) Gentlemen's farms extend to 100 acres or more. Selvejergaard is a tenure freely given by the State (something like a jagir) for services rendered. It descends on the first-born son and on failure of male issue reverts to the Crown. The Faeste system is one of oldest systems of land-tenure prevailing in Denmark. It is of 3 kinds, viz., (a) The simple Faeste which is a lease for 50 years. (b) Live Faeste is limited by

the lives of the tenant and his wife and (c) Arve Faeste which may be either perpetual or governed by the rule of primogeniture, reverting to the proprietor on failure of male heir.

The agricultural area of Denmark is 75 per cent. of the whole area, while the proper cultivated area is only about 66 per cent. The utilisation of cultivated area was as under:—

	1866	1888	1907
Grain	46.5	45.2	43.5
Root crops	1.9	4.2	12.0
Other crops	3.9	2.4	1.0
Fallows	9.3	10.3	8.9
Soiling crops			
& Grass	38.4	37.9	34.6

The average yield of crops per acre was: Grain about 1500 lbs. and hay about 4500 lbs.

GOVERNMENT DEPARTMENT OF AGRICULTURE.

The Danish Govt. has a Department of Agriculture embracing 17 branches, among which the most important are: (1) Central Administration (2) Veterinary and Agricultural High School (3) State Counsellors for Land Economics (4) Earth Cultivation and Improvement (5) Plant Culture (6) Domestic Animal Improvement and (7) Control over trade in Crop Produce. The annual expenditure on this department is about Rs. 4 millions, the chief of the Department getting a monthly salary of about Rs. 500 only.

From 1882 the Danish Government inaugurated the employment and organisation of agricultural advisers at the expense of the State. At present the Government has the following Counsellors

to give expert advice to agriculturists or their Unions free of charge. One Counsellor for each of the following, viz., (1) Agricultural Geology (2) Plant Pathology (3) Agricultural Chemistry (4) Fruit culture and Gardening (5) Agricultural Counsellor in England and (6) Agricultural Counsellor for the Faïre Islands. Two Counsellors for (1) Plant Culture (2) Horse-breeding (3) Breeding of Domestic Animals (cows, pig, sheep, etc.) (4) Agricultural Implements and Machinery each, four, Counsellors for Dairies and 7 Assistant Counsellors for Pig-breeding.

AGRICULTURAL ASSOCIATIONS IN DENMARK.

Besides numerous co-operative unions organised under the auspices of the Agricultural Associations, for special purposes, such as

- (1) Cattle-breeding, milk-testing, dairying, sale of milk, butter and cheese;
- (2) Pig-breeding, bacon-curing, sale of bacon;
- (3) Poultry-keeping, egg-collection and export;
- (4) Joint purchase of cattle food, seeds, manures, dairy cow and machinery.
- (5) Joint Sale of dry roots, potatoes, vegetables, straw and live-stock;
- (6) Shows and exhibitions of live-stock, butter, cheese, etc.

There are two great organisations of agriculturists in Denmark, viz.,

- (1) Landbo-foreninger, the union of large farmers and

(2) Husmands-foreninger, the union of small holders called housemen, which look after the agricultural development and land-economics generally. Both of them receive State grants and are bound to furnish yearly balance sheets and full report of their yearly operations, to the Minister of Agriculture.

The success of the Danish Co-operative system may be attributed to (1) The system of general education conducted in their primary schools (2) The universal applications of the co-operative principle to every department of agriculture. (3) The practical interest which the Government of the country takes in these co-operative organisations, and last though by no means the least (4) The unremitting zeal and industry of the people themselves.

The whole of Denmark is divided into a number of districts and in each of these districts conferences of co-operators are held at regular intervals. All questions of public policy affecting agriculture are framed in accordance with the opinion advanced by these conferences. At the same time the various experts employed by Government are in constant touch with the co-operative societies and are always available to give useful technical advice in the farming industry. In agricultural industry in Denmark, cows stand first as a source of profit, then come pigs. In many farms cows alone pay splendidly and as a matter of fact some of the larger farms do not keep pigs or poultry.

CO-OPERATIVE MOVEMENT IN INDIA.

The co-operative movement was started here about 20 years ago. In

the beginning the pioneers were confronted with many difficulties arising out of ignorance, indifference and popular conservatism. The true spirit of co-operation is not as yet strong or widespread. "Nevertheless," says the Government Report, "real progress has been made as will be apparent from the following figures." During 1923-24 there were 48,369 agricultural credit societies with 1,566,553 members and Rs. 14,93,00,000 for capital. But real progress cannot be judged by figures alone. The official Report gives us the assurance that "the movement is spreading and its possibilities as a great economic and educative force in the land are being more widely recognised." The aim of the Co-operative Dept, resembles in many respects that of the Dept. of Agriculture both having the same objective viz., raising the economic standard of the people.

The main function of the co-operative Dept. has hitherto been the development of a sound system of rural credit, but latterly more attention is being given to the building up of non-credit societies, the duties of some of which are closely allied to the district extension work of Agricultural Departments. It was felt that by working together they could do much to narrow the gulf between the theory and practice of agriculture and to get cultivators in large numbers to incorporate into their farm practices agricultural improvements effected by the Dept. of Agriculture. The relations between the two depart-

ments are in most provinces becoming increasingly close, but are not yet as close as they ought to be.

1625 non-credit Agricultural Societies worked during 1923-24 but the progress made by many of them has not been entirely satisfactory. Cattle-breeding, cattle-insurance and dairy societies have mostly failed to make any headway owing to want of local interest and other causes. Co-operative cotton sale societies, especially in the Bombay Presidency, have made some progress but other societies are hopelessly lagging behind.

DRAWBACKS IN INDIA.

India is labouring under various disadvantages amongst which the following are by far the most important (1) Lack of initiative and enterprise in the people as well as the State. (2) The Govt. Depts. are more theoretical than practical and they are not in touch with the people. (3) No real help is derivable from Govt. experts who draw high salaries but have little experience and less willingness to help the people (4) Official red-tapism and want of co-operation between the different departments of Govt. (5) Ignorance and indebtedness of the masses and (6) General apathy and lethargy of the people. Unless these obstacles are removed no real progress will be discernible.

By Mr. Nilananda Chatterjee, M.A., B.L., Vakil, High Court & Hon. Secretary, Bengal Humanitarian Association Howrah.

CO-OPERATION & EDUCATION.

CO-OPERATION may be a dull and prosaic subject to discuss, but it has in it, 'potentialities to assist the progressive and patriotic task of working out problems for reconstruction before the Nation'. Sir M. Visvaśarya in his last presidential address at the Indian Economic Conference, had summed up the general economic position of India in two words, 'Ignorance and Poverty'. 286 millions of people out of the 318, 942, 480, the total population of the whole of India, are sunken down beaten into a state of resigned fatalism, from which hope is shut out, and their lives drag on wearily and unprofitably as if with no objects in view. The people are waiting for a money monsoon which never breaks. The average monthly income per head has fallen so low as Rs. 5! which shows how miserably and indescribably poor the masses are. The economic condition of the people is as deplorable as it can possibly be. The question arises, if it is for ever, for the country, to remain in the silent depths of the treacherous Ocean, the molecules of which are constituted by the two items of 'Ignorance and Poverty'. Are the great masses of our nation doomed to perpetual poverty?

Wherever we look, we seem to be enshrouded and enwrapped in a cloud of depression, but we should not allow it to be a cloud of despair. Every thinking Indian, who is anxious about his country's future, should brace up and make an all-along effort to raise from the silent depths a great nation, steeped in poverty bordering on destitution. They should

draw precedents from the example of Russia, where the peasants have won a victory, in the Industrial Revolution, in a sort of awful silence, by gradual transformations of guilds and communes into co-operatives. The present political activities in India, do to some extent resemble that of Ireland, where the nationalist party had attached undue importance to the political question which naturally weakened the producers of the economic wealth.

Co-operative movement, as is proved in other countries, is one of the greatest economic forces, and is the only all-in-all lever for lifting up the masses from the ocean of poverty. The economic organisation of small industries, which is so essential to national well-being, can best be secured through Co-operation.

But when we turn to the experience of workers in the field of co-operation, in India, we hear the cry of one and all, 'Illiteracy is our enemy'. All the fat of co-operation is in the fire, all along of the dense ignorance prevailing among the members of the co-operatives, which were otherwise promising. The illiteracy is the insurmountable difficulty which is to be confronted, and which makes the revival of co-operatives quite impossible. We can play, have played to some extent, the devil of 'Poverty' with co-operation, but we can not bear up against his brother devil 'Ignorance'. As without literacy, it is hard to inculcate among co-operators, the essentials of co-operation, we need education to go forward among the people and prepare the way for co-operation to follow in its

ake. Nowhere in the world does it seem to have succeeded with illiterate masses, and unfortunately our country is at the bottom of the list in point of literacy and consequently it has got much less way to make up in co-operation.

If the co-operative institution in our motherland India, is to be made efficient and co-operative, the illiteracy needs to be banished. The village schools must be made the door of all rural improvements, economical, social and political. But what is that one can suggest after the earnest pleading for education? It is compulsion in the matter of Primary Education. Universal elementary education, co-operation, improvement of the economic condition of the peasantry, spread of industrial and technical education, building up of the industrious strength, these are some of the tasks in front of us in order to obviate poverty and ignorance.

The Government should examine the existing system of administration in its bearing on the economic life of the country, and should enquire into the economic condition of the masses, and then should adopt measures to check the processes of exploitation, and reduce the expenditure of the central government and lighten the burden of taxation. It should shoulder its responsibilities for the development of indigenous industries, by spreading industrial and technical education all over the country.

The District Boards should also bear a part in the matter; in order to fight against the crime of ignorance and poverty, it should undertake to provide expenses of running the schools in

villages, at present. Where there are co-operative societies, as those villages are somewhat trained to discipline and realise the importance of education, and are better fitted for the introduction of compulsory education.

As for the promotion of co-operative propaganda, for the improvement of the economic position of the peasantry, and the organisation of small industries, we require the support of national enthusiasm, and the interest of the general public. It is expedient and incumbent upon the political leaders and the lovers of the country to press for the development of both the things. What we require are the co-operators in spirit and in knowledge and not the nominal profit-seeking co-operators.

—BY MR. D. DAYAL.

A process for extracting oil from potatoes unfit for food has been invented in Australia. Tubers in various stages of decay may be treated to yield a colourless and odourless material especially valuable for lubricating delicate mechanisms such as are found in scientific instruments and accurate balances. The low freezing point of the oil is said to make it adaptable also for airplane engines and instruments. The process is inexpensive and simple and does not require large manufacturing facilities. It is claimed the method will greatly reduce the losses from spoilage in potato growing districts by reclaiming vast amounts of waste.

A French scientist claims that he can grow a plant from which artificial petroleum can be made. He proposes that a hundred thousand acres of West Africa be devoted to raising this plant, and says twenty million gallons of petroleum could be produced in that area. The oil, he asserts, is as good as that taken from the wells in America.

REPAIRING SHEET METAL ARTICLES.

SHEET metal and other household articles of a similar nature often give trouble and their repair necessitates delay, worry and trouble. All these can be avoided if the art of repairing them at home be learnt. The task is a simple one done with simple accessories.

Of the several operations necessary for household repairs, the use of the soldering iron and manipulation of sheet metal stand prominently forward. It is an easy matter to acquire the necessary skill.

The usual form of soldering iron is that illustrated at Fig. 1, and it may be had small and neat for very light jobs, or larger and heavier for general work. The smaller one is useful enough for very light work, but the iron is too small to retain the heat long, though very convenient where gas is available for heating it.

For general work the larger tool becomes a necessity, but the form shown in Fig. 2 is easier to manipulate than the straight one. In all cases the bit is a lump of copper held in an iron socket.

The tinning may be done in two or three ways. The iron is heated to faint red, screwed in a vice, filed rapidly to clean the scale and brighten it, and it may then be rubbed on a lump of sal-ammoniac, and applied to a bit of solder on a sheet of tin or iron or on a slab of wood, and rubbed about until it takes up a coating of the solder; or take one of the common bricks which has a recess made in it to hold the mortar, and put

into it a little resin and a lump of solder, and rub the iron in the hollow. This method has to be preferred as the rough brick keeps cleaning the surface of the iron, which rapidly picks up the tin; and if from any cause the operation is difficult, a few drops of any soldering fluid will almost instantly set matters right. The brick, with the solder that remains, is always ready for use.

Before commencing to repair metal work, which in general will be sheet metal (tin, brass, copper and zinc) a few inexpensive tools are needed. First, a box-wood mallet, with one end rounded and the other flat, about 3 in. in diameter—a tool easily procurable or easily made by any turner; secondly, a block of hard wood, hollowed out on one side with a hemispherical cavity also about 3 in. in diameter, or larger if the wood will allow it. It will be convenient to have one still larger. Neither recess need be deep; an inch in perpendicular measure will generally suffice, as the purpose of these blocks is to round up such tin plate articles as sauce-pan or kettle lids, of which the curvature is generally slight the bottom of these blocks may either be level, to stand on the bench—kept steady by a couple of nails driven into the bench, or better, by a carver's screw passing through the bench—or the bottom part may be sown so as to produce a tenon, to be secured in the leg-vice.

The novice should acquaint himself with the carver's screw which is a simple but useful tool. The tapered end is screwed into the block below, and the tail part passes through a suitable hole

in the bench, and is secured by the washer and bow-nut.

A hatchet-stake and a beak-iron may be made to order by a blacksmith—the first to enable the workman to turn down the edge of a piece of tin in forming a seam, the other for folding taper tubes such as that of a coffee-pot spout or sauce-pan handle, or the spout of a lamp feeder or oil-can. The hatchet stake, carved horizontally (Fig. 6) will also be required for putting new bottoms to sauce pans, water-cans, and such like articles.

In addition the following accessories will be required, viz., vice, pliers, hammers, and a bench; a few assorted copper rivets, and a punch or two—flat at the end to punch the piece out—for making rivet holes. A pair of tinman's snips, or small spears, will also be needed; and with these alone most of the suggested repairs can be done.

The illustrations are: Figs. 1 and 2, soldering-irons (straight and hatchet); Fig. 3, snips; Fig. 4, a different form, intended for vice-work, and called shears (the snips will suffice for most jobs of mending); Fig. 5, a hatchet-stake; Fig. 6, carved ditto; Fig. 7, mallet; Fig. 8, beak-iron; Figs. 9 and 10, blocks (the second sown to a tenon to be held in the vice). It will be plain that substitutes may be used for one or two of these. Instructions for actual work are now given. Let us consider a typical case. Suppose there is something wrong with the kitchen kettle. Fig. 11 shows the sorry plight it is in, viz., an elliptical bit of iron with a big hole in the middle, and slightly cupped. This can be mended

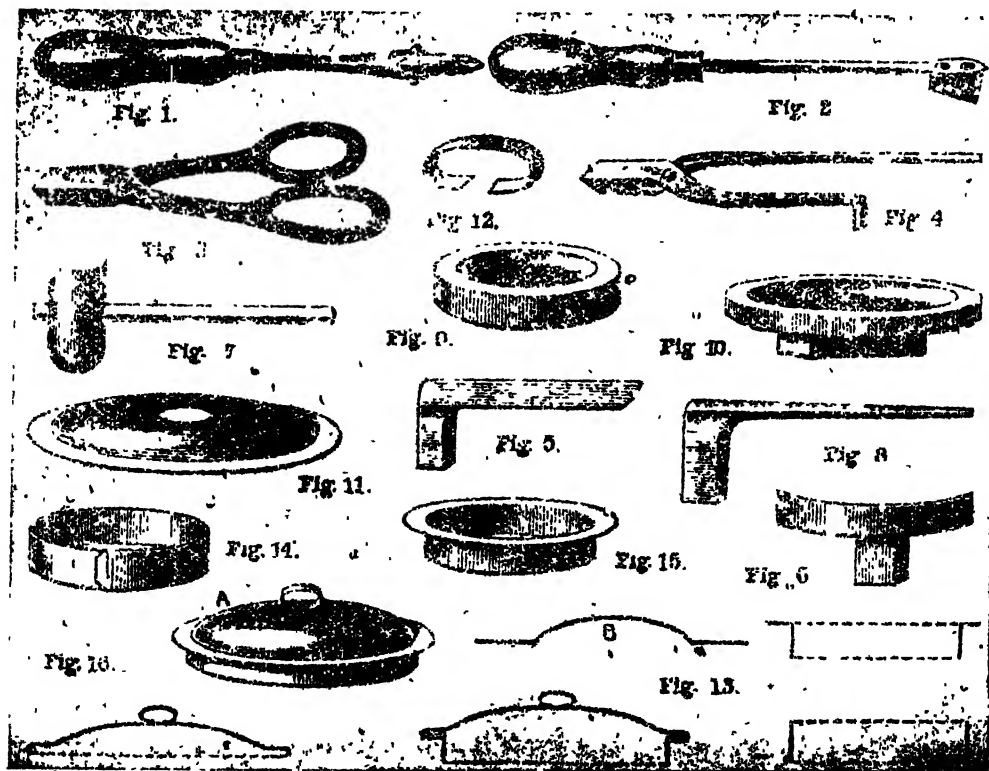
perfectly in the following manner. It will be seen that the rim is eaten off by rust, and also a great part of what was once the folded edge, and the hole for the handle is terribly enlarged from similar causes. But it is possible to make it serviceable again by simple methods. Lay the cover down on a piece of board half an inch thick or more, and draw a black lead pencil line round it. Cut out this with a key hole or frame saw. Make another line $\frac{1}{8}$ in. inside the first, and trim to this with chisel, rasp, knife, or any available tool; and then see if it will go into the mouth of the kettle. It should enter easily, as it will swell with the steam by and by. Now it remains to attach this under the metal top, to take the place of the rim of tin that used to be there. Probably it will be found that the nails cannot be fastened near the edge, as it would split the wood, so a single screw should be passed through the cover; but, as this is much too large, a washer must be cut to overlap the hole, and if the screw is passed through this, and screwed well home, it will at once secure the whole affair. But there is no handle, and the screw—a round-headed brass one by preference—is in the way, as regards solder. Bend a strip of tin almost to a circle (Fig. 12) loosen the screw till the ends can be fixed under the washer, and screw down tightly. Thus a serviceable kettle lid handle is completed easily without solder. It can be coated over with black varnish.

Take a sheet of stout tin plate and mark out an ellipse of the required size, using the old cover as a guide if it exists, but if not, a pattern can be easily cut

out of card-board, and transferred to the tin plate by scribing round it. Let it be a little larger than the original, which it will be seen has a folded edge, which will be required also on the new one. It will, moreover, contract it somewhat to make it of a hollow character if this is considered necessary—which, however, as a fact it is not. As a first attempt, the outer edge should certainly be left an inch wide all round, and the cover only hammered up to a small extent about the centre. It will then have the form of Fig. 16, A, seen in section at B. The cover thus partially shaped should be only large enough to overlap

the orifice or mouth of the kettle $\frac{1}{4}$ in., of which overlap $\frac{1}{8}$ in. is now to be turned over on the curved hatchet-stake using the flat side of the mallet or pane of a hammer; but, though bent over, it is not to be beaten down close. This turned seam is, in fact, to hold the rim in place, as well as to give a neater appearance to the cover.

The rounding up or cupping of the central part is not difficult. It is only necessary to lay it on the hollow block and hammer it with the rounded end of the mallet, occasionally giving a few blows also to the edge laid upon a flat surface. It will soon be perceived at



Repairing Sheet Metal Articles

what part the blows are necessary to keep the work even, and the process should not be hurried, but carried on gently, so as to avoid risk of puckers along what is to be the flat border. A sheet of tin is now to be cut for the rim which enters the kettle, about 8 in. in width and just long enough to lap a little when bent to shape. It should be bent round and tried on the kettle itself, and the lap fastened with a touch of solder. The edge has now to be bent all round at right angles to such a width as will allow it to enter the turned-in edge of the cover, which is then to be flattened, close down upon it so as to hold it securely.

• Fig. 14 is the strip bent and soldered; Fig. 15 the same with its edge turned out square; Fig. 16 the cover put in place with the rim attached. To make it clearer, outlines or sections of these parts are added. It is not even essential to solder any part of a cover made in this way, as the rim, when once secured in the fold of the top part, cannot possibly get away from it by use, but a little solder is generally run round the fold, to add to the security of the parts. In soldering this or any tin work, let the iron be quite hot, but always below a red heat, which would at once destroy the tinning. Sprinkle a little powdered resin along the seam; pick up, by touching it with the heated iron, a bit of solder, which will hang as a drop upon the tinned surface, and transfer it to the

seam. Hold the latter so that the tendency of the melted solder will be to run downwards, and it will follow the iron and be led along by it until expanded, leaving a neat and thin layer and firmly uniting the parts together. A badly tinned soldering iron will not pick up or lead the metal; and if insufficiently heated it will leave it in lumps, and no real union of the parts will be made. The metal on which the solder is to be spread needs to be itself heated to the temperature of the solder, so as not immediately to chill it; hence the difficulty of soldering thick pieces unless they are first heated over a fire or gas flame so as to melt solder when applied to them.

When mending is needed upon work that has become rusty or dirty, it must be well cleaned and then re-tinned by rubbing the iron upon it without solder and resin, or sal ammoniac, until the surface is fairly coated again; but it is often very difficult to persuade the solder to deposit on such surfaces, and it may be more economical to throw the rusted articles away and replace them altogether by new ones. To get over the difficulties make a solution of zinc in hydrochloric acid and keep the same handy.

For patching and small repairs new tin sheets need not be bought. Biscuit tins, tin canisters, etc., when used up and emptied can be preserved and cut open. The tin can be laid aside in the form of small sheets, circular pieces, etc.,

PREPARATION OF FLORAL OTTOS

(By A Practical Expert.)

THERE is an air of freshness associated with the natural floral ottos which cannot be discerned in the best of artificial essences. Moreover, the scents of the former are of a more permanent nature and not at all evanescent, like the latter. It is, therefore, that the *itts* find ready and wide application in the indigenous art of perfumery in preference to others.

The fundamental principles underlying the preparation of floral ottos are similar in every case while the basis of all of them is the same.

Freshly bloomed flowers are selected as they are the most fragrant. They are stalked, removing the green calyxes and gently freed from dirt and dust without injuring the petals. They are steeped in sandal oil, heated on the water bath, and finally filtered through a funnel. The filtered otto is collected in a stoppered phial and placed in the sun for a number of days to clarify.

A sediment will form at the bottom leaving the supernatant liquid thin, limpid and clear. Otherwise it will be thick.

What is known as "*Ru*" in the vernacular is nothing but concentrated otto or flower abstract.

ROSE.

Procure 4 oz. fresh rose petals all of one colour (say crimson) and free them from dust, etc. Next take 16 oz. sandal oil in another vessel and heat on the water bath for half an hour. Take away, throw the petals into the oil, cover up and set aside for one hour. Then

squeeze out the oil from the soaked petals and heat the oil again on the water bath for half an hour. Take away and soak in it 4 oz. fresh petals for an hour. Squeeze out the oil and repeat the above process once again. Finally squeeze out the oil and store in stoppered phial. Put in the sun for one month and it will be clear.

ROSE.

(Another Recipe.)

Procure rose petals of one colour and lay out $\frac{1}{2}$ inch. thick in a vessel. Cover them with a clean piece of rag moistened with sandal oil and folded 4 times. The cloth should be thoroughly wetted by rasping. Lay out over the rag another lot of rose petals. Make up in this way sixteen layers. Then close up the mouth of the vessel and place in the sun for 15 days. Finally press out the otto. Store in a stoppered phial and place in the sun for a month to clarify.

BELA.

Bela flower (stalked) 2 srs; and sandal oil 1 sr. Put these two ingredients together and heat on the water bath for half an hour. Place the vessel for 15 days in the sun and then squeeze out the soaked flowers. Put in a stoppered phial. Do everything in a cleanly manner.

JUI.

Jui flower (stalked) 4 oz. and sandal oil $\frac{1}{2}$ sr. Put the two together in a vessel and cover up. Heat on the water bath for half an hour and set aside for 16 hours. Take the soaked flowers on to

in flannel and express the oil. Now put a fresh lot of 4 oz. flowers with this oil and heat on the water bath for half an hour. Repeat the process for 10 times. Finally press out the oil, store in a stoppered phial and place in the sun for one month to clarify.

HENA.

Put 4 oz. *Hena* flower into a wide-mouthed bottle; throw in 15 grs. Benzoic acid and pour in 20 oz. clear sandal oil. Place in the sun for 16 days. Then filter through filter paper (on a funnel).

Put the filtered oil again in the bottle and soak a fresh lot of 6 oz. flower. Close the mouth and set aside for one month. Finally filter through filter paper and store in a stoppered phial.

MUSK HENA.

Take 8 oz. *Melhi* flower; 6 grs. musk; and 12 oz. sandal oil. First macerate the musk with a little sandal oil in a stone mortar. Dilute it with the remainder of the oil and put in a wide-mouthed bottle. Throw in the flowers, shake well, close up the mouth and set aside for one month. Finally filter through a funnel and store in a stoppered phial.

BAKUL.

Procure 5 srs. of picked *Bakul* flowers. Dirt and dust should be gently removed otherwise the final product will be spoilt. Put the flowers in a glass, stone or earthenware vessel and fill up with 16 srs. of clean water. Dissolve 4 dr. salt in the water previously. Place the vessel in the sun continuously for 8 or 10 days in a place open to the sky.

On the 4th or 5th day a thin oily film will appear on the surface; it will form into scum in a day or two. Care-

fully take this away with either a feather or a cotton swab and put in a glass phial. Remove it as often as it forms. When all the scum is thus cleared place the phial in the sun to clarify.

This is known as *Ru* or flower abstract 4 dr. of it diluted with 8 oz. pure sandal oil will yield otto of superior quality.

CHAMPAKA.

Put 500 freshly bloomed *Champak* flowers in a jar and strew over them 15 grs. benzoic acid. Pour 24 oz. sandal oil into it, close up the mouth and place the phial in the sun and in the dew at night for one month. Finally filter through filter paper. Put in a stoppered phial and place in the sun for a fortnight to clarify.

KANTHALI CHAMPA.

Procure 100 fresh and clean flowers, and 1 sr. sandal oil. Put the two ingredients together in a vessel; close up the mouth and heat on the water bath for half an hour. Take away and leave aside for 24 hours. Strain through a funnel and separate the flowers. Put the oil in the above vessel and soak in it a fresh lot of 100 flowers. Heat on the water bath for half an hour and set aside for 24 hours. Separate the flowers as before and put the oil in the vessel. Soak in it a fresh lot of 100 flowers, cover the mouth and place in the sun for 16 days and in the dew at night. After that filter through filter paper and store up in a stoppered phial. Place in the sun for one month to clarify.

JOHURI CHAMPAKA.

Procure 400 freshly bloomed *Johuri Champaka*, reject the green stalks and

put in a porcelain jar. Strew over them 15 grs. Benzoic acid and pour in 24 oz. sandal oil. Place in the sun for 15 days, and squeeze out the otto. Put in a stoppered phial and place in the sun and in dew at night for one month.

NAGESWAR CHAMPAKA.

Procure 1 sr. selected and clean *Nageswar* flowers and 1 sr. sandal oil. Put the two ingredients together in a vessel, close up the mouth and heat on the water bath for half an hour. Take away, leave aside for 24 hours and press out the oil. Put the oil again into the vessel and soak in it 1 sr. picked flowers. Heat on the water bath for half an hour and then leave aside for 15 days in a cool place. Then press out the oil and store in a stoppered phial. Place in the sun and in dew at night for a month to clarify.

SHEPHALICA.

Take 1 poa stalked *Shephalica* flowers, put in a vessel and pour over them half seer sandal oil. Cover up and set aside for 24 hours. Filter through a funnel. Put the otto again into the vessel and soak into it a fresh lot of $\frac{1}{2}$ poa flowers. Repeat the process 10 times. Thereby a concentrated otto will be obtained. Finally clarify by placing in the sun for one month and in dew at night.

GANDHARAJ.

Procure 5 srs. fresh *Gandharaj* flowers free from dirt and reject the stalks and green parts. Lay out $\frac{1}{2}$ sr. of flowers at the bottom of a porcelain jar, strew over it 1 oz. magnesium carbonate. Spread out on it another layer of $\frac{1}{2}$ sr. flowers and strew over it 1 oz. mag. carb. In this way make up 10 layers.

Close up the mouth of the vessel and place in the sun and in dew at night for a fortnight. Now separate the flowers after dripping and pour into the residue of the jar $\frac{1}{2}$ sr. sandal oil. Place the vessel in the sun for 15 days and finally filter through filter paper. Place in the sun for a month to clarify.

HASU-NO-HENA.

Pick bunches of *Hasu-no-hena* flowers just at dusk weighing 5 srs. Lay out 1 sr. at the bottom of a vessel and spread over it a piece of clean rag covering all sides. Lay out on it another layer of 1 sr. flowers and form in this way 5 layers with rags intervening. Finally cover up with rag and scatter 20 oz. pure sandal oil. Cover up the mouth and place in the sun for 20 days. Press out the oil and store in a stoppered phial. Place in the sun for a month to clarify.

PATCHOULI.

Take $2\frac{1}{2}$ srs. of patchouli leaves; pick, dust and clean and pound them into fine powder. Then lay out $\frac{1}{2}$ sr. of the powder at the bottom of a vessel and spread on it a piece of cotton cloth. Lay out on it another layer of $\frac{1}{2}$ sr. powder. Form in this way 5 layers covering the last one with cotton cloth. Scatter on the top 1sr. sandal oil, close up the mouth of the vessel and place in the sun for a month and in dew at night. After that press out the oil and store in a stoppered phial. Finally place in the sun for 1 month to clarify.

RAJANIGANDHA.

Take 1 sr. fresh tuberose, put them in a vessel together with 1 sr. sandal oil, close up the mouth and heat on the water bath for 20 minutes. Leave aside

for 12 hours. Then squeeze out the oil and put the oil again into the vessel. Soak a fresh lot of $\frac{1}{2}$ sr. flowers and repeat the process for seven times. Finally press out the oil and store up in a stoppered phial. Place in the sun for a month and in dew at night to clarify.

MALLIKA.

Procure a quantity of freshly bloomed flowers and lay out a portion of it one inch thick in a spacious vessel. Spread over it some cleaned and beaten cotton $\frac{1}{2}$ inch thick covering all sides. Lay out on it another layer of flowers and form in this way 10 layers. Pour on the top 1 sr. sandal oil cover up the mouth of the vessel and place in the sun for 20 days. After that pour out its contents on to a piece of flannel and squeeze out the oil. Store it in a stoppered phial and place in the sun to clarify.

LEBU.

Take 3 srs. of pumelo flowers free from stalks, put them in a wide mouthed bottle. Pour into it $\frac{1}{2}$ sr. sandal oil, close up the mouth and place in the sun for a month and in dew at night. Press out the oil, store in a stoppered phial and place in the sun for a month to clarify. The flowers must be freshly blown and not in bud.

KEORA.

Take half seer pollen of *Keora*, one seer tender leaves of the plant finely minced and 1 sr. good sandal oil. Put these three ingredients mixed together in a porcelain jar and close up the mouth tightly. Place in the sun for a month and then press out the oil. Store in a

stoppered phial and place in the sun for a month to clarify.

KAMINI.

Take 1 sr. *Kamini* flower free from stalk, put in an aluminium vessel; pour into it 1 sr. sandal oil, close up the mouth and heat of the water bath for half an hour. Set aside for 24 hours and then squeeze out the otto. Put it again into the vessel and soak in it a fresh lot of $\frac{1}{2}$ sr. flowers, and repeat the process twice. Finally press out the oil and store in a stoppered phial.

CHAMELI.

Take $2\frac{1}{2}$ srs. stalked *Chameli* flowers put into a clean jar and strew over them 15 grs. Benzoic acid. Close up the mouth and set aside for 24 hours. Next day pour into it 24 oz. sandal oil, close up the mouth and place in the sun for 20 days. Then filter through filter paper on a funnel store in a stoppered phial and place it in the dews for one month.

DOLAN CHAMPAKA.

Procure 2000 stalked *Dolan Champaka* flowers. Take 10 srs. of clear water in a large earthen bowl. Dissolve in it 2 dr. saltpetre and stir briskly. Now throw the flowers into it, mix gently and place in an open space. After seven days a thin film will appear on the surface. Remove this carefully with a feather without disturbing. Put in a stoppered phial. When all the films are collected close the mouth and place in the sun for a month and in the dew at night.

KHUS KHUS.

Procure 10 srs. of *Khus* root; free them from dirt and cleanly wash in water. Dry them in the sun and pound into fine powder. Put the powder in a

retort, pour 30 srs. clear water, close up the mouth and apply heat. When half the water has boiled over, remove it from fire. Now collect the otto from the distillate.

KHUS KHUS.

(Another Recipe.)

According to a more convenient method boil down 30 srs. of water until 10 srs. have evaporated. Put the pounded *Khus* roots in an earthen vessel and pour the boiled water on it. Leave it in an open space. After 7 or 8 days a scum will arise on the surface. Soak the froth with cotton and put in a stoppered phial. Place it in the sun for a month and in dew at night to clarify.

JHANTI.

Take half seer of stalked *Jhanti* flowers and put in a wide-mouthed bottle. Pour into it 2 srs. good sandal oil. Close the mouth and place in the sun and in dews for 24 hours. Then squeeze the soaked flowers and immerse in the oil a fresh lot of half seer flowers. Close the mouth and place in the sun and in dews for 24 hours. Repeat the process for 16 times changing the soaked flowers by fresh ones. Finally press.

MADHUMALATI.

Take $\frac{1}{2}$ sr. *Madhumalati* flowers. Gently free them from dust. Put them in an aluminium vessel. Pour 1 sr. sandal oil into them and heat on the water bath for 15 minutes. After 24 hours wring out the flowers. Steep in the oil another lot of $\frac{1}{2}$ sr. flowers and heat on the water bath for 15 minutes.

Repeat the process 12 times. Finally strain through a piece of flannel. Put in a stoppered phial and place in the sun to clarify.

GLOSSARY.

Bakul—*Mimusops elengi*; Mulsari; Borsali.

Bela—Arabian Jasmine.

Chameli—Catalonian Jasmine.

Champak—*Michelia champaca*; Shampang, Champa.

Dolan Champa—*Plumeria*; Kanagala, Gulachin.

Gandharaj—*Gardina* or Cape Jasmine.

Golap—Rose.

Hena—*Lawsonia*; Mehndi, Marithondi.

Jhanti—*Barleria*; Tadrelu; Koilka.

Johuri Champa—*Magnolia mutabilis*.

Jui—*Jasmine auriculatum*.

Kamini—*Murraya Exotica*; Marchula; Naga glunga.

Kanthali Champa—*Artabotrys odoratissimus*; Madmanti, Manoranjita.

Keora—*Pandanus odoratissimus*; Keora, Kenda, Tabun, That-tha-pu.

Khus Khus—*Vetiver*; Bena, Panni, Valo.

Madhumalati—*Echites caryophyllata*.

Mallika—*Jasmine arborescens*; Adavi.

Nageswar Champa—*Messua Ferrea*.

Nebuphul—Lemon flower.

Pachapat—*Patchouli*, mali, pachpanadi.

Rajanigandha—Tuberose.

16 ch.=4 poa=1sr.=2. lb.

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Small Trades & Recipes.

Removing Tattoo Marks.

Apply a highly concentrated tannin solution on the tattooed places and treat them with the tattooing needle as the tattooer does. Next vigorously rub the places with a lunar caustic stick and allow the silver nitrate to act for some time, until the tattooed portions have turned entirely black. Then take off by dabbing. At first a silver tannate forms on the upper layers of the skin, which dyes the tattooing black; with slight symptoms of inflammation a scurf ensues which comes off after 14 to 16 days, leaving behind a reddish scar. The latter assumes the natural colour of the skin after some time. The process is said to give good result.

Hair Dye.

Infuse black tea, two ounces, in one gallon of boiling water; strain and add three ounces of glycerine, half an ounce of tincture of cantharides, and one quart of bay rum. Digest this mixture for a couple of days, and perfume with essence of rose or bergamot, or any other favourite essence to suit the taste.

Printing Ink.

Melt together, with constant stirring, 1 pound of rosin oil, 3 ounces of rosin, and 3 ounces of soft yellow soap, until a homogeneous mixture is formed. The consistency is regulated by an addition of rosin oil. Lamp black and other colouring substances are added after the varnish is cold.

Lime Juice Glycerine.

Lime or lemon-juice $\frac{1}{2}$ a pint; heat in a porcelain mortar to near the boiling point, and add gradually rose water, elder-flower water, and rectified spirits, of each 2 ounces. Agitate the whole together. After 24 hours' repose, decant or filter through calico or muslin, then add of pure glycerine $2\frac{1}{2}$ ounces and oil of lemons half drachm. Again agitate them together for some time, and by careful manipulation you will have a somewhat milky liquid; but it should be quite free from any coarse floating matter or sediment.

Disinfecting Fluids.

A good disinfecting fluid, such as phenyle can be prepared by working the recipe.

Creosote	40 gal.
Rosin powdered	56 lbs.
Caustic soda lye	9 gal.
Boiling water	12 gal.
Methylated spirit	1 gal.
Black treacle	14 lbs.

Melt the rosin and add the creosote; run in the lye, then add the matter and methylated spirit mixed together and add the treacle; boil a little till dissolved and mix well together.

Hair Dye Pomade.

Nitrate of silver 1 part, nitric acid 2 parts, iron filings 2 parts. Mix, and let them stand together for 4 or 5 hours, then pour them on oatmeal 2 parts. Next add lard 3 parts, and mix well together.

INDIA'S INDUSTRIAL PROGRESS.

Sugar Industry of Travancore.

Recently the foundation stone of a sugar factory which is shortly to be established in the Travancore State was laid by the wife of the Dewan. The Travancore Government is a substantial partner in the concern, having contributed one-fourth of the capital. In the past, the jaggery produced in Travancore has been exported in the raw state outside the territory, only to be received back as a manufactured article. The annual value of such export is Rs. 10 lakhs. It is proposed to utilize the raw material in the State itself for the manufacture of sugar, the by-products being used for distilling arrack in the Government distillery.

Use Of Agricultural Machinery In India.

Signs are not wanting that India is on the threshold of an era of agricultural development in which modern agricultural implements and scientific research will play a great part. H. E. the Viceroy told the Associated Chambers of Commerce recently that the views of all the provincial Governments had been invited on definite proposals for the improvement and development of agriculture on scientific lines. It is stated that Government and co-operative credit organisations will come to the aid of the cultivator in purchasing modern agricultural equipment.

The report of the Agricultural Department of the Central Provinces states that the use of small power plants by the farmers is increasing, and is en-

couraged by the ready grant of Government advances. The use of tractors is also extending in different provinces. In the Berar a large machinery show, to which exhibits were sent by British firms, was held at Wardha, and was attended by a large number of farmers who took a keen interest in the demonstrations of Western implements.

Cotton Growing Experiments in Burma.

As Burma is noted for its minerals and its rice people naturally lose sight of the efforts made by its Agricultural Department in growing crops other than rice. The department is doing excellent work in experimenting with cotton. The Mahlaing farm is mainly concerned with the improvement of Wagale cotton and with the isolation of improved hardy high yielding cotton strains with good ginning outturn and improved staple for dry zone conditions. Selection work with Wagyi cotton has been carried on and one of the best strains has been sent to other farms for trial. The Tatkon farm is another place for cotton experiments, and trials in the sowing data for Wagyi and Cambodia cottons give a general indication that early sowing is essential to the success of the former while the latter does best when sown late. At the Agricultural Station at Allanmyo, it is the intention of the Director to make the selection of Wagyi and Cambodia and the production of pure seed of these selections a dominant part of its programme in the coming season.

SCIENTIFIC AND TECHNICAL TOPICS.

Alcohol From Bakery.

A remarkable claim is made for a process invented by an Italian engineer which is now being used in one of the biggest co-operative bakeries in Germany. It is stated that it enables alcohol to be extracted from fermenting bread dough. The machinery, which is simple and does not hamper baking, is connected to the oven by pipes, and operates as soon as the loaves are placed in the oven. It is calculated that if all the bakeries in Germany fitted the new invention to their ovens, 8,000 hectolitres of alcohol could be produced annually, which is half of Germany's annual requirements, and would mean an immense saving in coal, grain and potatoes.

Glass Substitute that Transmits Ultra-violet Light.

A new kind of glass, of organic origin, which is reported to permit the passage of ultra-violet light has recently been perfected by two Austrian scientists. The new glass is called Pollopas, and it is made by a chemical condensation of urea with formaldehyde. Pollopas is considerably lighter than ordinary glass, weighing about one and one-half times as much as an equal volume of water, while common glass often has triple the weight. It is quite soft, being somewhat softer than mother-of-pearl, and is easily abraded. It is very transparent.

The first form of the product obtained in the manufacture is a liquid but under the action of heat it is solidified

and acquires the properties of a special glass. It may easily be worked into all kinds of curves, is not soluble in either water or alcohol and is so homogeneous that it may be used for many optical purposes. Its index of refraction varies between 1.9 and 1.54, or about the same as that of rock crystal.

Pollopas may be coloured easily by boiling it for a few minutes in a heated alkaline solution of the colouring matter. It will be employed in the manufacture of toys, of various objects of finery, to make automobile windshields, and for greenhouse panes. The fact that it is permeable to ultra-violet light may make it especially valuable in the growing of plants indoors.

Fighting Pests By Aircraft.

Recent reports from the Philippines tell of successful demonstrations of the control of locusts by army aviators dusting arsenate of lead from airplanes. Great clouds of locusts settle down on fields of sugar cane and soon destroy many acres. To stop this damage airplane "dusting" offered the only way, whereby large areas could be effectively and rapidly covered with a quick-acting insecticide. This method of controlling crop pests was originated in the southern United States as a means of combating the boll weevil and has been applied successfully in fighting various pests that cannot be reached and overcome in any other way.

FORMULAS, PROCESSES & ANSWER.

Peptonising Milk.

3370 T. U. F., Kalutara—Wants an easy method for peptonising milk.

The best method of sterilisation is to place the milk in bottles provided with screw or plug stoppers, put the bottles in a steam steriliser, and gradually raise them to 100 deg. C., keeping them at that temperature for at least half an hour; but by using an autoclave the temperature could be raised to 110 deg. C., and about ten minutes at that temperature would be even more efficient. The milk would not have the burnt taste that it has when boiled over the fire, but it would not taste like new milk.

It is very desirable to sterilise milk either before or after it has been peptonised, otherwise the bacteria present would grow at such a rate as to render the milk unfit to drink in a very short time. Sterilisation is only nearly perfect at a boiling heat, and for perfect sterilisation sometimes two or three boilings are essential.

Manufacture of Watch Glasses.

3511 K. G. S., Rajkot.—Wants to manufacture watch glasses.

The modern manufacture of watch glasses differs from the early methods only in the perfection of its tools and better division of the work, but the principle has not been altered.

A tube has its end dipped in the glass pot and a work man blows a small bulb; this is softened by holding it near the door of the furnace, and, the end of the tube being put into communication with a reservoir of compressed air, a big sphere is blown. This sphere, about 1 yard in diameter, must be produced without rents, and must be of the requisite thickness. From it are cut convex discs of the size required. The modern method is to use a "tournette," which is a compass having a diamond as its marking point. Its use is delicate work. The diamond having traced the circle, the latter is struck on both of its sides with a stick so that it may be detached. Using this disc as a template, the succeeding glasses are obtained very easily. The circles which are cut out touch each other, and leave as waste only the very smallest possible quantities. An able workman will cut 6000 glasses a day. After the separation, the glasses are in the form of more or less concave discs, following the shape of the sphere from which they were cut. Their edges require to be deepened for the purpose of raising them sufficiently over the surface of the dial to leave a free circulation of the hands. One way of doing this is to place the disc over moulds of fine earth containing a receptacle of the form which the glass is desired to take. These moulds are thrust in an oven, and when

the glass is softened by the heat a workman with a plug of paper forces down the glass into the receptacle. After this operation, it is necessary to polish the whole of the glass on a stone.

Cementing Celluloid to Glass.

2932 D. V. S., Kurnool.—Wants a recipe for cementing celluloid to glass.

To cement celluloid, etc., to glass use either of the following.

(1) Dissolve 2 parts of white shellac and 1 part of venice turpentine in 7 parts of methylated spirit, and pour off the clear liquid. (2) Heat canada balsam on a stove until it is hard, then dissolve 1 part in 3 or 4 parts of benzine. Apply to the xylonite and allow to dry on, then moisten with a little of the warm solvent employed in making and press to the glass. Lip glue (that is, a mixture of glue size and sugar) might be used, but it would give way if exposed to damp.

Boiling Linseed Oil.

195 K. L. G. C., Cawnpore. Wants to know the process of boiling linseed oil.

When only small quantities of boiled oil are required, the most simple plan is to boil the oil in an iron or copper pan of about 20 gallons capacity, with an enlarged mouth to prevent the oil from frothing and threatening to prime over. This pan is at a certain height furnished with a collar or circular flange which supports it on the rim of a sheet iron furnace, fed preferably with wood charcoal. The pot being filled to the extent of half of its capacity with oil,

and therefore containing about 10 to 11 gallons, the fire is lighted, and as soon as boiling commences the driers are added in small quantities at a time with constant stirring with an iron rod. The proportion and the nature of the driers used vary much. For the quantity of oil in the pot, either of the following mixtures may be used:—

• 2½ lb. of red lead and 2½ lb. litharge; or 2½ lb. of litharge and 2½ lb. sugar of lead; or 1½ lb. of red lead and 3½ lb. sugar of lead; or 1½ lb. to 3½ lb. of borate of manganese; or 2½ lb. of hydrated oxide of manganese.

The driers are previously ground as finely as possible and the oil well stirred after each addition. As soon as the driers are all in and the frothing has ceased the pot is filled with oil just up to the neck, and the fire regulated so that the temperature does not rise above 220 deg. C. by means of a thermometer with metallic frame work. The operation is generally complete in three hours, during which time the driers are frequently stirred up from the bottom. The pot is then withdrawn from the fire, and the oil is set aside to clarify; or if it be desired to start boiling a fresh batch it is run into a galvanised wrought iron tank.

LIMITATION OF FAMILY.

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A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a God-send. Ask for table of detailed contents which will be sent free.

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Axle Grease.

91 T. S. T. S. Lahore.- Wants recipes for axle grease.

(1) **GENERAL.** Melt together 14 lbs palm oil, 22 lbs anthracene oil, 10 lbs. rosin oil, and 1 lb soap, keeping the mixture heated until a clear, transparent mass is obtained, then allow to cool.

(2) **FOR WOOD** Take 2 gallons of "medium" rosin oil, and stir in 5 lbs of quicklime, slaked with 2 gallons of water. Then stand for 12 hours, or until the next day. Pour off any water that may separate. Then stir in 5 gallons of coal-tar grease oil and 5 lbs. of powdered black lead. Generally it will be found sufficient to mix the materials cold, but a little heating will make a more homogeneous grease.

Glycerine Soap.

113 N P P., Alleppey.- Requires hints on the manufacture of glycerine soap.

Nearly all soaps contain a small quantity of glycerine which is not separated in the lyes. In some cases, however, a much larger quantity is desired, up to some 6 or 8 per cent. To mill this it requires great care, otherwise the soap tends to blister during compression. The best way is to dry the soap somewhat further than is usual, till it contains say only 9 or 10 per cent, moisture, and then mill in the glycerine.

Preserving Concentrated Infusions.

b. F. D. M. Midnapore.- Asks how to preserve *Panchan* (Infusion of indigenous herbs).

Two general methods are recommended for the preparation of concentrated infusions employing dilute chloroform water and alcohol as a preservative. The finished product when diluted in the proportion of 1 part to 7 parts of water is fairly approximate to the corresponding fresh infusion. In the first process, Repercolation, half the drug is moistened with the menstruum and percolated, the remainder is then moistened and percolated with the first percolate until completely exhausted. The weak portions are evaporated and added to the stronger and made up to volume. By the second method, that of Macero-Expression, the quantity of drug ordered per 20 fl. oz. is macerated in 15 oz. of the menstruum in a covered earthenware vessel for 24 hours, pressing slightly when the drug is not completely covered with the menstruum, strain and press the marc, to the resulting liquid add any other ingredients specified, and reserve; repeat the maceration a second and third time for 6 hours each, and evaporate the resulting mixed liquors, add them to the reserved portion and make up to 20 fl. oz., set aside for 7 days and filter. When diluted alcohol is used the third maceration may be omitted, and only enough menstruum used in the second to make the expressed united liquids measure 20 fl oz.

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High Class Ready Made Swadeshi Clothes.
Madras Tassar Coat Rs. 4/- and Rs. 3/-;
Suit Rs. 7/8 and Rs. 5/4; Twill Shirts Rs. 1/8;
Jaffer Shirts Rs. 1/6; Warm Frocks As. 1/12-
1/4 with order. We defy competition in Prices
and Artistic Cutting.

MAHINDRAKAR BROS.,
Bombay No. 4 or 12 & Poona City.

P. M. Nagpur. Requests us to advise how oil stains can be removed effectively.

If the stain occupies a large surface, extract by treatment with any of the following solvents, viz, methylated spirit, amyl alcohol, ether, acetone, chloroform, carbon tetrachloride, carbon disulphide benzine or petrol oleic acid and turpentine.

If there be only small spots cover the stains with fine whiting. Then make a ring of solvent at some considerable distance from the spots. Keep this ring of solvent all the time. Lastly, drop solvent on the whiting. As the solvent evaporates it will drive the oil into the whiting.

Civet and Its Test.

193 G. H. M. J., Bassein—Wants to know what civet is and what are its tests.

Civet is a glandular secretion occurring in an outwardly discharging pocket underneath the tail of the civet cat, native to Northern Africa and the Indian Archipelago, and the musk rat, which are kept in captivity for the purpose of abstracting from them the civet, which is always formed anew, after being removed by means of a little spoon, or the spontaneously ejected substance is collected.

Fresh civet is a whitish yellow mass, of the consistence of butter, which becomes thicker and darker when exposed to the air. It is of nauseating odour when in concentrated form, but when diluted, as in tincture, it is valuable as a binder or fixer of other perfumes.

The usual dose is 10 to 15 grains to 1 gal of alcohol.

Civet is frequently adulterated with principal adulterants being, castor oil, other fats, banana pulp, and vaseline.

A genuine civet should have the following characters:—

Moisture	15 to 30 per cent
Mineral matter	0 to, 2 per cent
Soluble in petroleum ether almost entirely	
Acid value of petroleum extract	130 to 150
Sugar	None.

Removing Iron From Clay.

45 J. B. F. Jaffna—Seeks our advice for removing iron from clay in the making of earthenware.

Metallic iron from filings, bolts or nuts from the mill and other similar sources is apt to cause trouble when goods of fair surface are to be produced, as in the sanitary and sink trades. In the production of earthenware, such impurities are specially sought for and



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removed. For white burning clays it is necessary to remove all particles of metallic iron which may be present. This is usually accomplished by passing the washed clay, in the form of slurry, through boxes containing magnets, or, better still, by attaching magnets to the revolving arms of the wash mill or blunger

Definition of Vitamine.

79 R S B, Blype—Requests us to define Vitamine

The name Vitamine has been given to the substance or substances, which, though present in minute quantities in foods, are absolutely essential to a continuation of the life process

Vitamines are present in almost all animal and vegetable substances used as food. In the animal body they are less abundantly stored in the muscles than in the parenchymatous organs. In plants we find them especially in the leaves and other green parts, that is specially in the vegetative organs, whereas the parts used by the plants for storage, such as

bulbs, tubers, and roots, contain them in less abundance. Fruit, too, in the kitchen sense of the term, is rich in vitamine and so are seeds. Within the individual organs, the vitamine content of the various tissues differs greatly. The germs of seeds are specially rich in vitamine. In like manner the vitamine content of eggs, which are the animal counterpart of seeds is concentrated mainly in the yolk. Milk is extremely rich in vitamine

As it is extremely difficult to isolate and study vitamins our knowledge as to their composition and function is scanty

Litharge.

219 J K D, Mynigyn—Asks what is litharge and how to get it pure?

On heating lead for a prolonged period in the air (or on heating the hydroxide, nitrate, or carbonate), an amorphous yellow powder of lead oxide is formed, the common name for which is Massicot. On melting massicot and then allowing it to cool more or less rapidly a more or less reddish yellow scaly mass of lead oxide results which is called Litharge. This is obtained in large quantity in the extraction of silver, and in the preparation of sodium nitrate; in the latter case it is obtained pure, whereas that given by oxidation of lead always contains 8 to 10 per cent of the metal. Lead oxide has a markedly basic character and saponifies the fats. It is used for the preparation of many other lead compounds, such as the acetate, etc., for glazes, in glass-making, and in the manufacture of earthenware.

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Used by all nations for preserving and beautifying the hair and keeping the head cool and brain refreshed
Rs 1 1/4 per bottle

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BRIEF QUERIES. AND REPLIES.

Questions of any kind within the scope of Industry are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.

1 M B, Hosharpur—Lac dye may be used in lacquer work on wood. Can supply stick lac, seed lac and kapila powder.

2 T D C Rangoon—Refer your query to the Consul General for Norway 22 Canning Street, Calcutta. Cigars may be supplied by M Subbaya Pillai, Trivandrum. Satyanarayan Cigar Works, Penugonda. Kristna and Fatima & Sons, Cigar Stores 25 B, Phayre Street, Rangoon.

3 S C A Bangalore—Do not make any alteration in the recipe published in Industry. You may use white dye as basis of coloured fountain pen ink, if it does not leave any sediment. In case of blue-black ink you may use iron vessel and in case of coloured ink you should use earthenware vessel.

4 M R I Bhandara—Glass phials required may be bought of C K Das & Sons, 17 College Street and Sitacharan Paul & Co 194 Old Chinabazar Street both of Calcutta. For analysis try Dr B Ghose's Laboratory 5 Cooper's Lane Calcutta.

5 S P, Sambalpur—Small cinema machines may be had of J. F. Mullin & Co Tarachand Dutt Street Calcutta.

6 F D M Ghatal—You may add a little quantity of rectified spirit.

8 R R A T, Malabar—For cotton pressing machine enquire of H M Mehta & Co, 123 Esplanade Road, Fort, Bombay.

9 M C P, Trichur—Cotton braids are manufactured with the help of machines which may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

10 M P I, Palamcottah—Carpenter's tools may be had of N G. Mitra, Chandney Chowk, Calcutta.

11 K S S, Rawalpindi City—For industrial books enquire of Book Co, 44A, College Square and Thacker Spink & Co.; both of Calcutta.

12 S. S. R, Nizamabad—For good printing

of pictures enquire of Industry Printing & Process Dept, Keshub Bhavan, Shambazar, Calcutta; Calcutta Fine Art Cottage, 76 Dharmatala Street Calcutta and Mariklal Maganlal & Co, 34 Church Gate Street, Bombay. Picture frames may be supplied by Bombay Fine Art Gallery 69 Esplanade Road and Staff Art Framing Works, 40 Meadows Street, Fort, both of Bombay. Glass sheets may be had of Mahomedally Allibhoy Kachwalla & Co, 220-3 Abdul Rehman Street and Budhabhoy Noorbhoy, 314 Abdul Rehman Street, both of Bombay. For powdering machine write to Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. There is perhaps no book on picture frame moulding. An article on the subject however, appeared in August 1924 issue of Industry.

13 I I I, Trichur—A series of articles on canning appeared in April, May, and June 1924 issues of Industry which you may consult with advantage.

14 U S R R, Udampet—Apply soda ash for washing mobil oil barrel.

17 I L A G, Kandy—Anhydrous sulphuric acid may be bought of B K Paul & Co, 1-3 Bonfields Lane, Calcutta. Is in need of waste zinc.

18 N K R, Gadagari—For fibre decorticator write to Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

19 S S C, Allahabad—Wants to know the

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ORIGINAL HOMEOPHARMACISTS,
42, Strand Road, Calcutta,
Dealers in Original Homeopathic dilutions
and Biochemic Testimonials
Catalogue Free On Application.

address of Government security dealers of abroad, specially Paris

20 C. D. C., Ghatkopar.—An article on paper manufacture appeared in April 1925 issue. It is advisable for you to take help of a paper expert for starting paper industry. Almost all the paper mills of India are under foreign management.

21 E. M. R., Amritsar.—For directories of Bombay and Calcutta write to Thacker Spink & Co., 3 Esplanade East, Calcutta. For the dictionary required enquire of The Book Co., 44A, College Square, Calcutta.

22 S. A. B., Hyderabad.—Wants to know the complete address of Mr. Henry Ford; will any of our subscribers communicate to him the proper address?

24 C. R. D., Jamnagar.—Assafetida may be bought of S. S. Batheja & Co., Peshawar City. Process of making artificial assafetida appeared in July 1923 issue.

26 D. H. S., Karwi.—Refer your query to Chicago Telephone Supply Co., Hornby Road, Bombay. Yes, you may remove your spinning factory to the Punjab.

27 M. N., Katha.—The articles mentioned by you have not yet been put in the market.

28 B. D. S., Meerut City.—Cigars are manufactured by M. Subbaya Pillai, Trivandrum and Satyanarayana Cigar Works, Penugonda, Kristna. For tin boxes enquire of Gajanand Rampertap & Co., 6 Halsi Bagan Road, Calcutta. Wants to buy smoking tobacco and chewing tobacco.

30 G. A. S. I., Tisayanvilai.—Damp-proof glue may be bought of Ghatak & Co., Rai Bahadur Road, Behala, Calcutta. Damp-proof side painting mixture for matches may be supplied by Bhowani Engineering & Trading Co., 122/1, Upper Circular Road, Calcutta.

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31 G. R. V., Shahpur.—For cotton darning machine enquire of Khadi Pratisthan, 45 College Square, Calcutta. Small ice plants may be had of Giacomo Jucker, Apollo Street, Box No. 11, Bombay. Soda ash may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Glass bottles and phials may be bought of S. K. Dey, 124 Shova Bazar Street and Satya Charan Pal & Sons, 194 Old China Bazar Street, both of Calcutta.

32 N. S., Raichur.—Guts may be supplied by Ad Meyer, 5 South Tangra Road, Calcutta. To communicate with any querist write him with name and number under care of **Industry** when your letter will be duly redirected.

34 V. H. S., Khandwa.—For securing second-hand flour mill advertise in the Sale & Exchange Column of **Industry**.

35 A. C. J., Mooltan City.—Refer your query to the Principal of the college from which you passed the Overseer examination.

37 R. C. L., Budaun.—For electric batteries write to B. M. Singh & Son, 150/1, Lower Chitpore Road, Calcutta.

38 S. R. R., Chanda.—Knitting machines may be supplied by Economic Hosiery Mills Ltd., 50/2, Dharamtola Street and Indo-Swiss Trading Co., 27 Pollock Street, both of Calcutta.

39 D. H. S., Karwi.—If you burn "jari" you will get silver and other metals. **Industry** is not published in Hindi.

40 D. V. S., Kurnool.—Glass bottles may be supplied by Mizouchi & Co., 75 Nichome, Kita Kyuhojimachi, Higashi-ku, Kyoto, Japan; Kashai Brothers & Co., 2 Chome, Sannomiya-cho, Kobe, Japan and C. F. Beetz, Grossbreitenbach, Thuringen, Germany. For printed tin boxes you may write to Industries Blechwarenfabrik G. m. b. H., Elisabethufer 53, Berlin and Gesellschaft fur Blech-Emballage 4 Plakat Industrie G. m. b. H., S. Schinkestrasse 8-9, Berlin; both of Germany. Essences may be supplied by Schimmel & Co., Miltitz Leipzig and Heine & Co., A-G, Leipzig, U. Groba; both of Germany. Wants to buy assafetida.

44 R. S. P., Razmak.—You may consult The Exporter's Directory of Japan published

by the Imperial Commercial Museum of the Department of State for Agriculture and Commerce, Tokyo, Japan. There is no translated edition of *Industry* in Hindi or Urdu.

46 C S Jaffna—For learning glass industry try to be an apprentice in a glass factory. For your convenience we give below a list of glass factories: Calcutta Glass and Silicate Works, Belgachia, Bengal Glass Works Ltd, DumDum, Calcutta and Allahabad Glass Works, Naini, Allahabad.

48 S B S, Santipur—Trade enquiries are not generally repeated. Moreover your enquiries are in the nature of an advertisement.

51 J M N K, Kaimganj—Sewing machines may be bought of Singer Sewing Machine Co, Dalhousie Square East, Calcutta. Lanterns may be supplied by Elliot & Co, 6A Clive Street and G F Racet & Co, 111 Radha Bazar Street, both of Calcutta. Buckets and tubs may be supplied by M C A K Paul Co, 20, Ultadanga Road and Bengal Galvanising Works, 43 Mujeedbari Street, both of Calcutta. There are many book sellers throughout the important towns of India. It is therefore advisable for you to consult a directory. For the present the following addresses may serve your purpose: D B Taraporevala Sons & Co, 103 Medow Street, Fort Bombay; Book Co, 44A College Square, Calcutta; R Cambray & Co, 9 Hastings Street, Calcutta and Andhra Publishing House, P O Box 73, Madras; and Civil and Military Book Depot, Elphinstone Street, Camp Karachi. Tin and brass may be bought of K B Sathi, 365 Aditwar Pet, Poona; E A Currim, 17 Apollo Street, Bombay and K D Chatterjee & Co, 15 Raja Woodmunt Street, Calcutta. Matches are imported by H Rashid & Co, 15 Zakeria Street, Calcutta and E S Abdul Kyam, 39 Issaji Street, Vadgadi, Bombay. Matches are manufactured by Bande-Mataram Match Works, Tallygunge, Calcutta; National Match Factory, Canal East Road, Ultadanga, Calcutta; Star Match Factory, Lucknow and Indian Match Works, Jagannaikepur, Cocanada. Caps may be bought of Hajee Ahmed & Co, 212 Old China Bazar Street and K Eduljee & Sons, 5 Dharantala Street; both of Calcutta.

Woollen shawls may be bought of Nehal Chand & Co, Chauri Bazar, Ludhiana; Indian Woollen Mills Ltd, Labani Mansions, Sandhurst Road, Bombay, and Kaiser-i-Hind Woollen, Cotton & Silk Mills Ltd, Bangalore. Silk cloths may be supplied by Sasanka Shekhar Bagchi, Khagra, Murshidabad, Daffarpur Silk Factory, Murshidabad, Bhagalpur Silk Stores, Sujaganj, Bhagalpur and Manram Harjiwansam Ghat, Benares City. Paper and stationery articles are imported by Nilmoney Halder & Sons, 106 Radha Bazar Street, Calcutta. The following are some of the soap factories in India: Calcutta Soap Works Ltd, 15 College Square, Calcutta; P A B, Punjab Soap Factory, 55/8 Canning Street, Calcutta; Dacca Soap Factory, 32 Ranken Street, P O Wari, Dacca; Indian Industrial Development Co, 46 Tamarind Lane, Bombay and Bool Bool Soap Factory, 30/31 Johnston Road, Dacca. Chemicals are imported by B K Paul & Co, 13 Bonfields Lane, Calcutta. Articles dealing with the formation of a private as well as a joint-stock company will appear in an early issue of *Commercial India*, the sister journal to *Industry*. Your other queries are in the nature of an advertisement hence these should not be published in these columns.

53 L G M Sind—The following is a recipe for destroying rats. Melt 8 ounces of phosphorus in 1 gallon of hot water and add 10 pounds of corn and meal then rub up gradually and add 10 pounds of butter and 5 pounds of sugar.

54 K S K S I Gujrat—Recipes of hair dyes appeared in January 1925 issue of *Industry*. For hair oils please go through the booklet, Hair Oil Manufacture published

THE SECRET OF SOAP MAKING

It will teach you how to prepare at home coloured and scented Toilet Soap, Glycerine Soaps, Soaps like Sunlight Soap, Washing, Laundry and other useful soaps with the least trouble and expense. The author is a manufacturer for years and with success. Price, Rs. 2 only. V. P. charges extra.

THE HINDUSTHAN SOAP WORKS,

Publishing Dept. No. 1,
P O Nowasahar, Jalandhar

from this office. Recipes of "mukhbilas" will be found in December 1925 issue and formula of vinegar in September 1924 issue.

56 M. I, Basigalore.—The address referred to by you is correct.

57 J. H. G., Hubli.—A good recipe of tea essence appeared in July 1922 issue

58 R. G. J., Nowgong.—Wireworking machines may be supplied by L. Aug, Deiters Alfeld, Leine 2, Germany.

59 N. K. H., Cawnpore.—Full address of Asiatic Society of Bengal is 1 Park Street, Calcutta.

60 B. B. P., Agra.—Cinema films may be had of J. F. Madan & Co, Tarachand Dutt Street, Calcutta.

61 P. C. S., Jhang.—You may consult Thacker's Indian Directory to be had of Thacker Spink & Co, 3 Esplanade East, Calcutta and Kelly's Directory of the World published by Kelly's Directories Ltd, 182-184 High Holborn, London W. C. 1. Recipes of tooth powder will be found in March 1925 issue.

62 A. L. M. C., Rajgarh.—Barytes is an earthy mineral which is found both massive and crystallized. Sulphate of barytes is largely imported for adulterating white-lead. It is also employed in the manufacture of Jasper ware, in producing opaque white patterns as a coloured ground and in making pigment called permanent white. The nitrates of barytes are used in pyrotechnic for producing a green flame; and the carbonate of barytes in the manufacture of plate glass, in colour making, etc. Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta, deal in barytes and other minerals. Paints are manufactured by Pioneer Indian Paint & Oil Works, Near

Byculla Bridge, Byculla, Bombay; Bengal Paint & Varnish Works Ltd., 24 Strand Road, Calcutta and Murarka Paint & Varnish Works, Sodepur, 24 Parganas, Bengal. For importing minerals you may communicate with the following mineral brokers: Arthur Brown & Co., 126 Bishops gate London E. C. 2; Everitt & Co., 40 Chapel Street, Liverpool; D. W. Greenbough & Son, 21 Mincing Lane, London E. C. 3 and Le Personnel & Co., 99 Cannon Street, London E. C.

63 K. C. K., Akyab.—When you edit and publish any book the copyright is reserved by you. To safeguard your own interest you may make declaration before the District Magistrate of your district.

64 G. M. P., Mandla.—Refer your query to a medical practitioner who will help you much in solving your difficulties.

65 P. N., Nellore.—For trade art picture try Vale Office, Pondicherry, Madras. For securing agency go through Sale & Exchange pages of *Industry*. Can supply turmeric and good rice.

66 S. P. R., Barisal.—Refer your query to Dr. Chhatbar Homeopathic Institute, Mahuva, Kathiawar.

67 R. V. S. V., Tanuku.—For industrial machines enquire of Oriental Machinery Supply Agency, 20/1, Lal Bazar Street, Calcutta.

68 S. A. S. C., Benares City.—Dana is a kind of indigenous perfume used in preparing "hooka" tobacco and it may be had of Jadu Nath Ghar, Hukkapatty, Bara Bazar, Calcutta.

69 C. E. P. S., Negombo.—For catholic religious articles enquire of Oxford Mission, 49 Cornwallis Street, Calcutta. Hair oils of various sorts may be bought of B. K. Paul & Co., 1-3 Bonnelts Lane, Calcutta. Fancy articles of mother-of-pearl may be supplied by Ghougachia Mother-of-Pearl Factory, Malainagar, Jessore. Addresses of silk goods dealers appeared under No. 51 above.

70 B. R. S., Lahore.—Process of preparing phenyle and axle grease appears elsewhere.

71 B. S. J., Camp Tajpur.—For supplying bristles you may correspond with the following parties whether they are disposed to take your

"DIVINE" HERNIA "KAVACHA"

99 Per Cent. Cure, avoid operation and try our Divine "Kavacha." Mention name, age, and period of suffering with order. Price of one "Kavacha" with Postage Rs. 5/8/- Only.

H. C. ROY,

3 Madan Mitra Lane, CALCUTTA

goods: Bonner & Co., 209, Cornwallis Street; Calcutta; Volkart Bros. Armenian St., Madras and Narayan & Sons, Fatkapur, Cawnpore. For exporting bristles you may write to Olivier & Co.; 32 & 33 Hamsell Street, London, E. C. 1; Kiver Henry & Co., 5 Fenet, Fenchurch Street, London E. C. 3 and Welby Francis & Co., 9 Mincing Lane, London E. C. 3.

72 S. B., Bikaner.—Replies to your queries appeared in February and March issues under No. 2894 and No. 3167.

73 B. R., Rawalpindi.—Punjabi equivalents of gum tragacanth is not available. Hindi equivalent of rape is "sarson." Punjabi equivalent of logwood is not known. Its Bengali equivalent is "Bakkam." It is not possible to suppress the natural odour of vegetable decoction without affecting its quality.

74 S. H. S. B., Kathiawar.—Tea may be bought of Bhatiaherjee & Co., Ltd., 64 Cornwallis Street; Mukherjee Bros., 17-11, R. G. Kar Road and Brooke Boyd & Co. Ltd., 2, Metcalf Street; all of Calcutta. To communicate with any querist write him with number and initials under care of **Industry** when your letter will be duly redirected.

75 N. S., Lucknow.—Refer your query to the Director of Industries of your province.

76 N. A., Jullundur.—Articles of glass may be had of Calcutta Glass and Silicate Works, Belgachia and Bengal Glass Works, 39/1, Canning Street; both of Calcutta.

77 M. I., Abbottabad.—An article on cap making appeared in October 1924 issue of **Industry**.

78 D. R. L., Rajkot.—Refer your query regarding mineral water to Mr. E. Lakkaraju Naidu, Kharida Bazar Road, Kharagpur. One gallon is equal to 160 fl. oz.

80 P. P. G. Bombay.—Following are some of the chemists and druggists as required by you: Madras Medical Agency, Jeremia's Rd., Vepefy, Madras; British Medical Hall, 95 Sadar Bazar, Lucknow; British Pharmacy, 29 Hazratganj, Lucknow; Colvin Medical Hall, The Mall, Cawnpore; Dinshaw & Co., Omrit Bridge, Jubbulpore City; Economical Co., Chailpuri Street, Delhi; Indian Medical Hall, Moradabad; K.

MacDonald & Sons, Esplanade Road, near Fort, Delhi; Victor Bros, Preddy Road, Karachi and Ram Dutt, Patchouli, Lordganj, Jubbulpore.

82 Pyara Singh, Eburru-B, E. A., Kenya.—Cheap watches and watch repairing tools may be supplied by L. Basack & Co., 5 Old Court House Corner and Abretch & Co., 17 Radha Bazar Street; both of Calcutta. Patent medicines may be bought of Martin & Harris, 8 Waterloo Street and B. K. Paul & Co., 1-3 Bonfields, Lane; both of Calcutta. Injection tubes may be supplied by Bengal Immunity Co. Ltd., 205 Cornwallis Street, Calcutta. Motor cars may be had of Allen Berry & Co., 24 Park Street; M. T. Ltd, 60, Chowringhee Road and G. Mackenzie & Co. Ltd., 18 Park Street; all of Calcutta. Motor accessories will be supplied by the above firms.

83 S. N. D., Agra.—Machines may be supplied by Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. Process of manufacturing gold and silver laces will appear in an early issue.

84 J. K. A., Trichur.—For studying mechanical engineering you may write to Bengal Technical Institute, Jadavpur, 24 Parganas and Bengal Engineering College, Shibpur, Howrah. List of technical institutes appeared several times in these columns.

87. J. M., Katni.—Addresses of mineral dealers appear elsewhere in these columns. Market rates of different commodities appear in the columns of **Commercial India**, the sister journal to **Industry**. Addition of resin to soap produces much lather. For levigating plants enquire of Bengal Scientific Supplies Co., 29 College Street Market, Calcutta.

THE PEACOCK INK WORKS IMPERIAL INK TABLETS.

Unparalleled In The Market

Blue Black	Re. 1/4-	144 Tablets per tin
Red	Re. 1/4-	(1 Gross).
Green	Re. 1/8-	Postage & Packing Extra

Best Rubber Stamp Inks Blue, Red and Violet. Special rate to wholesale dealers,

Manufactured by:—

THE PEACOCK INK WORKS

Suppliers To The Imperial Bank Of India, & All Leading Mercantile Firms Of Calcutta.
18, Guruprasad Roy Lane, Hatkhola, Calcutta.

90 G S Kotah—Wants to be introduced to exporters of horn and hoofs honey feather linseed, garlic onion chillies, animal bones and skins Indian herbs and roots

95 T K Anantapur—Flour grinding machines may be supplied by Burn & Co Hongkong House Council Street and Marshall Sons & Co 99 Clive Street both of Calcutta The above firms will also supply you with estimates and other allied information

96 Roll 2584—Try a mixture of coconut oil and castor oil It is not possible to liquefy coconut oil at 14 degree C

98 J S S Fatehgarh—An article on cigar and cigarette appeared in September 1920 issue of **Industry**.

99 M M B Bombay—Sago forms the principal portion of the pith of the sago palms the "Gommuti" palm the Talipot palm and other allied trees For preparing potato starch take expert advice

102 G P V Harda—Match splints may be bought of Bande Mataram Match Factory Tallygunge, Bhawan Engineering & Trading Co, 1221, Upper Circular Road and Sunderban Match Works 12 Dalhousie Square all of Calcutta

104 A I J Nagpur—Recipes for lime juice glycerine appears elsewhere In selecting lime juice sold in market use your own discretion

106 J A P, Hanumankonda—Electrical goods may be supplied by B M Singh & Co 150 Lower Chitpur Road, Calcutta

107 P C P Chawnpore—Rickshaws may be bought of Calcutta Rickshaws Ltd 94A Mechua Bazar Street, Calcutta The address of The Faculty College of Homeopathy 7 Cornwallis Street Calcutta and that of Bengal Allen

Homeopathic Medical College is 13513, Bow Bazar Street, Calcutta Bronze powder may be bought of Hanuman Prasad & Co, 2 Bonfield Lane and Koylash Chafan Dutt & Sons, 20 Bonfields Lane both of Calcutta.

108 A K Kallai—For coloured lead enquire of H C Kurz S W Berlin Rochstrasse 5, and Dencke Jean Hadermuhle 7 Nurnberg, both of Germany Pencil making machines may be supplied by Scheidt & to Robert Furth, J Forster Nunnenbeckstrasse 30 Nurnberg and Maschinen fabrik Georg Musmann Nurnberg Baren's chauxstrasse 115, all of Germany

110 D V R R Tanuku—There is no institution known for learning block making Try to be an apprentice in a block making concern

112 S N M Poona City—For manufacturing steel trunks engage an expert mistry Machines required may be bought of Oriental Machinery Supply Agency, Ltd 201 Dall Bazar Street Calcutta

117 C G P Negapatani—Glass bangles are imported by F P Nalladai & Co 501 Canning Street and S Abdul Aziz 52 Canning Street, both of Calcutta Glass beads are imported by Aminchand Mehra & Sons 34 Armenian Street Calcutta

118 G M H Bhopal—Process of refilling dry batteries appeared in June 1923 issue Wants to buy clock work table fan

119 S K B C Comilla—Process of preparing varnish for printing inks appeared in January 1926 issue For printing ink you may go through Varnishes, Lacquers Printing Inks and Sealing Waxes by M L Braunt

120 A K S Bankipur—You may have handles of rubber stamp prepared locally by carpenter Unvulcanized rubber may be bought of Gopal Chandra Dass & Co 741, Clive Street and East India Rubber Exchange Co, San dhurst Road Bombay You may also go through Rubber Hand Stamps and the Manipulation of Rubber by Dr T O'Connor Sloane to be had of Thacker Spink & Co, 3 Esplanade East, Calcutta

121 P A, Bimlipatam—Recipes of soap and pain balm will be found in January 1926 issue

HIDDEN TREASURE

Right-Hand "Dakshinayan" Shankh. A Right-Hand Conch-Shell, 4" long, for Rupees Two Thousand Only If you want to prosper daily in Wealth and Health obtain this RARELY procurable & un-valuable GENUINE article, in a month, or until un sold Send money in Advance. Write with Stamp to —

T. NATH, SHUKLA,

22, AGARWAL KARJAN, (Baroda, India)

22, AGARWAL KARJAN, (Baroda, India)

123 S. P. T., Jharia.—Sugar candy may be had of Kshetra Mohan Rakshit & Sons, 115, Upper Chitpur Road, Calcutta. 'Ananta mul' and other Indian herbs may be had of Jadu Nath Ghar, Hukkapatty, Barabazar, Calcutta.

124 G. S. Golmuri.—Reply to your enquiries appeared in March issue under No 3353

125 G. D., Dadu.—Flour-milling and oil-extracting machines may be supplied by Burn & Co., Hongkong House, Council House Street, Calcutta.

126 M. A. H., Raipur.—You may purchase Kellys' World Directory to be had of Chakraverty Chatterjee & Co Ltd, 15, College Square, Calcutta. There is no such dictionary known to us. Can supply horns, bones and crocodile leather.

127 P. A., Bimlipatam.—Your query being in the nature of an advertisement should not be published in these columns.

128 B. C. S., Raipur.—Machineries used for cottage industry are stocked by Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta.

129 G. S. S. C., Gopalasamudram.—Gold and silver leaves may be supplied by Amitava Ghose, 100 Clive Street, Calcutta.

130 V. T., Bangalore City.—Your query is unintelligible.

131 C. S. D. B., Ahmedabad.—For list of widely circulated papers write to Calcutta Advertising Agency, 15, College Square, Calcutta. Refer your query regarding automobile monthlies to Automobile Association, Park Street, Calcutta.

132 T. K. S., Arumbakkam.—For disposing of Ayurvedic medicines advertise in pages of **Industry**.

133 K. S. N., Madras.—For remedying drinking habit take medical advice. You should mix sap green as mentioned in the recipe. A recipe of louse-killer appeared in March 1926 issue. Dyeing recipes appeared in August and September 1925 issues of **Industry**. Recipes of artificial assafetida will be found in July 1923 issue. Recipes of hair dyes appeared in January 1925 issue. No other process of discharging white is known to us. Recipes of 'tilak' used by

Hindu ladies on their forehead appeared in December 1925 issue.

135 B. N. S., Chittoor.—Your enquiry is receiving our attention.

136 M. N., Katha.—Wants to buy seeds and fruits of *Cocculus Indicus* and *Anamirta Cocculus* and picrotoxine.

137 P. J. R., Amritsar.—For starting industries with a small capital go through New Idea columns of **Industry**.

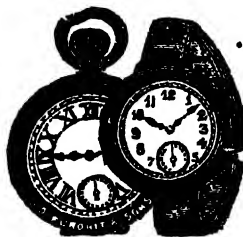
138 B. C., Kendrapara.—Patent stones and other kinds of stones of similar nature will not be suitable for using as roof-shed. You should try Ramgunge tiles.

139 S. M., Tungoo.—For testing gold you may use touch-stone. You perhaps mean, artificial gold which may be prepared with the following formulas. Gold may be prepared by melting together 96 per cent. of copper and 4 per cent. of antimony. To increase the density of the alloy a small quantity of magnesium and of calcium carbonate may be suitably added. Like gold the artificial product can be forged, welded, rolled and pressed. For purifying gold you may use nitric acid.

140 R. G., Nowgang.—To enhance fragrance use scents in increased quantities. It is not possible to turn black soap into white.

142 M. B., Multan City.—Your queries are in the nature of an advertisement hence these

GET BOTH THESE WATCHES FREE!



Accurate time-keeper, fancy design, beautiful shape, strong mechanism, winding every 30 hours, bright as silver, with secondhands, most durable and will need no repairs if carefully handled.

Such Fine and Cheap Watches never before appeared in India. Pocket Watch Rs. 4-8 each. Wrist Watch Rs. 5-8 each. Packing & postage As 8 extra up-to 6 watches. Buyers of 5 Watches in a lot will get. One of these Watches free of cost and postage.

J. D. PUROHIT & SONS,
7-D, CLIVE STREET, CALCUTTA

should not be published in these columns.

144 S. A. R. B., Montgomery—Following are some of the cloth manufacturers of Great Britain: Bentley & Co., 21, King Cross Street, Halifax; Barkerind Manufacturing Co., Barkerind Road, Bradford; A. Moore & Co., 50, Temple Street, Charlton-on-Medlock, Manchester and Woolf & Giffin, 12-22, Grosvenor St., Ardevick, Manchester. The jute mills of Dundee are Alexandra Jute Mills, 4, India Bldg; Allen Mill Co., 25, Albert Square, Ball Thomas & Sons of Dundee Ltd., 118C, Hawk Hill. Addresses of German novelty dealers appeared several times in these columns.

145 H. H. R., Mahmedabad—For disposing of tanned leather you may correspond with the following firms: Mohamed Amin Bros., 211, Mission Row, Calcutta; A. Alibhoy & Co., 63, Ezra Street, Calcutta; Jupiter Trading Agency, 20, Narayan Dhuru Street, Bombay and M. K. Shirjee & Sons, Umerkhand, Bombay. Can supply prepared 'hookah' tobacco.

146 R. C., Palghat—Recipes of soap like sunlight soap appeared in August 1921 issue.

147 S. A. C., Shanmuganathapuram—Banian knitting machines may be had of Indo-Swiss Trading Co., 27, Pollock Street, Calcutta. The above firm will supply you with estimates.

148 G. B., Maldah—Singer sewing machine parts and needles may be had of Singer Sewing Machine Co., Dalhousie Square East, Calcutta. Electric light batteries may be had of B. M. Singh & Co., 150, Lower Chitpore Road, Calcutta. Cycles may be supplied by B. S. A. Cycles Ltd., 27 & 28, Pall Mall,

London S. W. 1; Raleigh Cycle Co. Ltd., 41, Holborn Viaduct, London E. C. 1; Act-Ges. Varm. Frister & Rossmann S. O., Skaltitzer-Strasse 134 Berlin, Germany, and Act Gas Vorn, Seidel & Naumaun, Hamburgerstrasse 19, Dresden, Germany.

150 N. M. C. Saran.—For agency of motor car you may correspond with the following firms: Ford Automobiles Ltd, Hughes Road, Bombay, French Motor Car & Electric Co. Ltd, New Queen's Road, Bombay; Allen Berry & Co., 24 Park Street, Calcutta; and G. Mackenzie & Co., 18 Park Street, Calcutta and for that of cycles write to Bentinck Cycle Co., 40 Bentinck Street, Calcutta; Cycle Exchange & General Store, 41 Medows Street, Bombay; Standard Cycle Co., 59 Harrison Road, Calcutta. Aluminium utensils may be supplied by Jeewan Lall & Co., 55 Canning Street, Calcutta. In place of sesame oil you may use coconut oil and castor oil in equal quantity.

151 S. A. Y., Patna—For disposing of mica dust you may correspond with Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta.

152 I. P. S., Singareni Collieries.—Wants to buy a secondhand gramophone.

153 V. G. V., Bombay—A formula of casein appeared in February 1922 issue. Casein is principally prepared from skimmed milk. Refer your query regarding celluloid to Mr. M. N. Ghosh, 201, Lall Bazar Street, Calcutta. Can supply casein.

155 S. N., Hyderabad—We do not undertake analysing. For analysis you may write to Dr. B. C. Ghosh's Laboratory, 5, Cooper's Lane, Calcutta.

157 B. T. P. S., Aligarh.—Model maker's lathe has not yet been put in the market.

159 D. D. B., Ludhiana—Manufacture of dyes involves technicalities which require higher knowledge of applied chemistry. For manufacturing dyes you have to engage an expert. For dyeing cotton fabrics with indigenous dyes you may consult Dyeing by Sir P. C. Roy to be had of Book Co., 414A, College Square, Calcutta. Confectionery machines may be supplied by Seth Deepchand,

BED RELIEF IN TERRIBLE SUMMER "SITAL-PATI" (COLD MAT).

The monopoly production of the districts of Sylhet & Chittagong in Bengal. Introduction of "Sitalpati" to its user is needless, it cools the body & brings a sound sleep in the night; it is really a luxury, & is absolutely free from bugs & "pishoos." Price of each "Sitalpati" is from Rs. 1/12/- to Rs. 30/- according to quality. We also deal with all sorts of other

Agents, Wholesale & Retail, Liberal Terms

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Sukkur, Sind. For books on English confectionery making enquire of Thacker Spink & Co., 3 Esplanade East, Calcutta.

160 P. N. S., Rajkot Para.—A good recipe of face cream appeared in July 1924 issue of *Industry*.

162 B. D. B., Delhi.—Wants to be put in touch with importers of piece-goods and spices in South Africa and Egypt.

164 P. G. S., Holl Narsapur.—Aluminum utensils may be supplied by Maneckji & Co., 26 Church Street, Fort Bombay; Jeewanlal & Co., Kansara Chawl, Kalbadevi Road, Bombay, Indian Aluminium Co. Ltd., 32 Triplicane High Road, Madras and Spencer & Co Ltd; Mount Road, Madras.

165 A. B., Daska.—Formulas of "khushbudar suparian" are not known to us. Tin boxes may be had of Gajanan Rampratap G, Halsi Bagan Road; Calcutta Colour Printing Works, P.O. Box 6772, both of Calcutta.

166 R. S. R., Kollur.—For preparing "kasturi" pills consult an Ayurvedic physician. Pill making machines may be bought of Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. Witch hazel is not available in India; you have to indent the article through Smith Stanistreet & Co., 9 Dalhousie Square East, Calcutta. In refining almond oil apply the usual process of refining oil. The process of refining consists in treating the oil with animal charcoal in the proportion of four to one by weight. Animal charcoal should be finely ground before it is mixed to the crude oil. The whole is put in glass or china jars and covered over with a lid and is then exposed to the rays of the sun for 15 days successively. Impurities are absorbed by the charcoal and on filtering refined oil is obtained. Recipes of lime juice glycerine will appear in an early issue. It is not possible to deodorise naphthalene. For coloured tin boxes enquire of Indian Colour Printing Works 243, Upper Circular Road, Calcutta.

167 D. M. V., Bikaner.—No substitute for methylated spirit is known to us. For the alcohol required enquire of B. K. Paul & Co., 1-3 Bonfields Lane and Bengal Chemical &

Pharmaceutical Works Ltd., 15 College Square; both of Calcutta.

168 R. S. C., Jullundur City.—Process of preparing soap like sunlight soap appeared in August 1921 issue. Stearic and palmitic acids may be bought of D. Waldie & Co., 1 British Indian Street and B. K. Paul & Co., 1-3 Bonfields Lane; both of Calcutta.

169 D. R., Lahore.—For particulars regarding wireless telegraphy enquire of Director of Post & Telegraph, 1 Council House Street, Calcutta.

172 G. R. S., Delhi.—Following are some of the block makers of Calcutta: U. Roy & Sons, Garpai Road, Calcutta Fine Art Printing Syndicate, 147 Baranosi Ghose Street and The Photographist's Stores & Agency Co., 154 Dharamtala Street. Confectionery articles may be had of M. F. Beg & Co., 16B, Elliott Road; M. E. Britai & Co., 46-47 New Market and A Firpo Ltd, 18/2, Chowringhee; all of Calcutta. Tea may be supplied by Mukherjee Bros, 17-19, R. G. Kar Road; Bhattacharjee & Co. Ltd, 64, Cornwallis Street and N. L. Paul & Bros, 108 Cornwallis Street; all of Calcutta.

177 J. B., Bombay.—You may start match industry, glass industry, pottery, tin-printing and pen making, in Persia. These industries have prospects in the near future.

178 L. A., Irinjalakuda.—Arecanuts and betelnuts are same things. Vernacular equivalents of turmeric are "ambe, ran halad". No such dictionary is known to us. Please enquire of local book sellers.

179 A. L. N., Masulipatam.—Cigarette machines may be supplied by United Cigarette Machine Co., 59, Holborn, Viaduct London.

Bengal Sattie Food.

(Gold Medalists and Registered)

Certified By Government Medical College

USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers

Factory—Baranagar and Barisal,

Office—113, 114, Khangrapotty St., Calcutta.

Envelope making machines may be supplied by The Industrial Trading & Manufacturing Co of Western India, No 28 Ahmedabad. It is advisable for you to consult an expert for manufacturing cigarettes.

180 A. C. N., Daske—You may go through Poona Agricultural Journal, Poona, Indian Agricultural Journal to be had of Thacker Spink & Co, 3 Esplanade East, Calcutta and Bengal Agricultural Journal, Ramna, Dacca. For agricultural books enquire of The Book Co, 44A, College Square, Calcutta. Wants to buy copper clippings, zinc and tin.

181 H. S., Bahraich—Recipes of hair dye in powder will be found in January 1925 issue of **Industry**.

182 K. J. C., Trumangalam—It is difficult to suggest home industries suitable for the people of your locality without an acquaintance with local conditions and prospects. If you think over the adaptability of small industries suggested from time to time in the columns of **Industry**, you might come across some. There appears to be possibilities in rope making, plantain drying, coconut butter making and so on.

183 D. H. B., Faizpur—Your idea is impracticable. You should apply varnish or lacquer after printing. Recipes of lacquer used in tin plate will be found in July 1923 issue.

184 L. D. S., Jhalrapatam—Your enquiry is receiving our attention.

185 S. C. A., Bhandara—Gallic acid is mainly used in ink as a tannin. As regards ring worm ointment consult a physician. Try to manufacture milk powder after modifying the recipe to suit your purpose. For registration write to P. Lodge & Co, Po Box No 6772, Calcutta.

WONDERFUL SCIENTIFIC INVENTION

The World-renowned Black Hair-dye.

It turns Snow-white hair into soft glossy and natural black colour instantaneously on application. It is the simple and easy. Price per complete packet As. 9/- only. Postage extra.

FAZL BROS.,

10, Mechubazar Street, Calcutta

186 D. P., Patna City.—Full address of Mr Ambika Prasad Pandey is Bajhang, Jhulaghat, Dist Almora.

187 D. P. S., Nawabganj—Wants to be introduced to sole agent of Vanaspati ghee.

188 J. H. N. S., Bikaner.—A good recipe of glass cement appeared in October 1923 issue. Flies caught in flycatcher do not die instantly. For explanation of the term used in catalogue write direct to the party whose catalogue you used.

189 S. R. K., Bombay—Refer your query to The Philatelic Society of India, 15 Burrows Street, Bombay and The Calcutta Philatelic Mart, 46 Police Hospital Road, Calcutta.

190 K. G. N., Hindupur—Following are some of the lock manufacturers of Aligarh: Chas Ashtan & Co, Grand Trunk Road, Diamond Jubilee Lock Factory; Reliance Lock Works, Railway Road and Sporting Patent Lock Works.

191 S. A., Malvan—You may go through Indian Planters Gazette & Sporting News, P.O. Box 84, Calcutta. Coffee may be supplied by Sutaria Kothari & Co, Humnum Street, Fort and R. K. Motishaw & Co, 11 Humnum Street, both of Calcutta.

192 M. N. Katha—Dye impression photo press has not yet been put in market.

193 S. V., Raj Marwar—Wants rates of wolfram ore.

198 B. P., Agra—Cinema pictures may be had of J. F. Madan & Co, Tara Chand Dutt Street, Calcutta.

199 J. M., Karachi—Presence of water in soap determines inferior quality. This is due to want of drying sufficiently when boiled.

200 P. V. D., Bapatla—Wants to be introduced to sole agent of Pearson's pickle jars in India.

202 D. D., Lahore—For the jute cloth required enquire of W. G. Grant & Co. Ltd, Dundee Linen Works, Dundee and J. H. F. Henderson Ltd, Dons Road Factory, Dundee.

203 G. S., Khurja.—Secondhand books may be supplied by D. B. Taraporevala Sons & Co., 103 Meadows Street, Fort Bombay.

204 D. A. B., Faizpur.—Ottos may be bought of Khoda Buksh & Co., 7 Colootolla

Street and Paradise Perfumery House, 75, Colootolla Street; both of Calcutta

207 A. L. K. Rewari—Wants to buy Daisy butter churn. Pepsin is a peculiar principle found in the gastric juice and which in conjunction with hydrochloric acid also present in the stomach, confers upon it the power of digesting the albuminous portions of the food. It is mainly manufactured from the mucus membranes of a perfectly fresh pig's stomach.

208 K. B. K. Surti—For books on printing write to Thacker Spink & Co., 3 Esplanade East, Calcutta.

209 S. A. H. Sagar—For water pictures enquire of K. B. Nan, 234 Old China Bazar Street, K. G. Maniar, 55, 1, Canning Street, The Union Trading Co., 166 Harrison Road, all of Calcutta.

210 M. H. D. Rapoon—Umbrellas may be bought of Purna Chandra Basack, 10 Canning Street and Nafar, Chandra Atta, 43, Armenian Street; both of Calcutta.

211 R. H. T. Bombay—All sorts of inks you require may be bought of Bengal Miscellaneous Ltd., 99 Manicktala Main Rd., Calcutta. Recipes of all sorts of inks you require appeared in the last volume of **Industry**.

212 M. H. S. Bombay—For Derby Sweep tickets write to the Secretary, Royal Calcutta Turf Club, 12 Russel Street, Calcutta.

214 H. P. T. Palitana—Rubber tyres may be used as soles of slippers and shoes. Keora water is a kind of scented water. You should use linseed oil in the varnish. Yellow and black arsenic may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Gum required may be supplied by S. N. De, Po 7851, Calcutta. It will be advisable for you to procure the acids required from the market instead of manufacturing those at home.

215 S. A. C. Shahnuganathapuram—You may consult The Exporter's Directory of Japan published by The Imperial Commercial Museum of the Department of State for Agriculture and Commerce, Tokyo, Japan. You may go through Industrial Japan, Osaka and Japan Chronicle, Kobe; both of Japan. You perhaps mean sealing wax, the recipes of which

will be found in September 1923 issue. On the top of bottles you should put capsules of paper or of zinc whichever you like. These capsules may be supplied by P. S. Dutt & Bros 8 Ezra Street, Calcutta.

216 T. C. Bahmach—Cardboard boxes may be supplied by H. L. Sett & Sons, 8 Nilmoney Mitter Street and Kundu & Dass, 20 Gour Laha Street, both of Calcutta. Print labels according to your own design and affix these on the cardboard boxes. For label printing you may write to Industry Printing Dept., Keshub Bhaban, Shambazar, Calcutta. Recipes of good quality sealing wax will be found in October 1923 issue. Felt cap when manufactured will glitter by itself. Wants regular supply of wool for the manufacture of felt caps.

217 I. M. J. N. Uppattin—Watches of all sorts may be bought of L. Basack & Co., 5 Old Court House Corner, Radhabazar and Abretch & Co., 17 Radha Bazar Street; both of Calcutta. Novelties may be supplied by Laurel Novelty Co., 43 Park Street, Calcutta, The Union Trading Co., 166 Harrison Road, Calcutta, Mahomedbhoj Jivabhoj & Co., Nizam Street, Bombay No. 9, R. Mediratta & Co., Lahore and Indo-German Trading Co., Cocanada.

218 G. P. S. Benares Cantt.—For particulars of "makali" ghee write direct to the advertiser. We cannot venture opinion on this.

220 V. C. W. Nizamabad—Rouge may be bought of J. C. Cognar & Sons, 25-26 Clive Street, Calcutta and Bundhroodun Ahmedjee, 35-37, Sutar Chawl, Bombay.

NEW YEAR'S CONCESSION TANTRIC RING!



Special scientific combination of Eight-Metals, perfectly diamond cut, appearance Guinea-Gold, cures diseases, brings Health, Wealth, Happiness and Prosperity. Set of 3, 6, dozen and gross. As. -14/-, Rs 1/8/-, 2/8/- and Rs 25/3/- postage As. -7/- only. Manager,—

SHANKER GIRI KARYALAYA,
Askundabazar, Muttra U.P.

222 J. N. S., Ranchi.—Recipes of "hooka" tobacco appeared in October 1924 issue

223 D. N. S., Rangoon.—For ordinary tin boxes write to Gajanan Rampratap & Co., 6 Halsei Bagan Road and Tin Printing & Hollow Wares Ltd., La Touche Road, Cawnpore. For printed tin boxes enquire of Indian Colour Printing Work, 243 Upper Circular Road and The Calcutta Tin Printing Works, P.O. Box No. 6772, Calcutta.

224 R. K. C., Raipur.—For starting small industries with a small capital go through New Idea Columns of **Industry**.

227 M. A. R. B., Kymore.—According to the trade mark infringement law you will not be allowed to manufacture boot polish under the name of Cobra. For further particulars regarding trade mark take legal advice.

228 M. P. R., Anantapur.—The business of a travelling agent is profitable no doubt. But it requires special training and capacity. For this purpose you have to secure buyers of articles in the places you visit.

230 H. C., Meerut.—For catalogues you have to write to firms direct. So please explain clearly in what business you are interested when we shall be glad to supply you with necessary addresses.

231 T. N. A., Cawnpore.—Recipes of sealing wax appeared in September 1923 issue of **Industry**.

232 M. N. N., Ratnagiri.—Your previous letter is not traceable.

234 K. R. V. B., Rawalpindi.—For books on book binding enquire of Thacker Spink & Co., 3 Esplanade East, Calcutta.

237 I. H. K., Allahabad.—For wooden printing press write to S. C. Dutt & B. K. Dutt, 100 Durga Chauran Mitter Street, Calcutta.

238 S. R. S. B., Puri.—For vegetable lamp-black enquire of J. C. Coomar & Sons, 25-26, Clive Street and Kailash Chandra Dutt & Sons, 20 Bonfields Lane, both of Calcutta. Printing ink is generally prepared by mixing suitable dyes to a kind of varnish specially prepared for the purpose. Process of preparing printing ink varnish appeared in January 1926 issue of **Industry**. For preparing ink tablet use tablet making machines which may be had of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

241 K. T., Pedra.—Wood of all sorts having straight fibre is best suited for match boxes and match sticks. Boxes and sticks of bamboo will not be decent to look at and will not be so hard. Yes, you may manufacture buttons from coconut shell.

242 B. I., Puri.—We have got no book on soap manufacture to sell. You may go through *The Art of Soap Making* by Alexander Watt and *Soaps* by George H. Hurst to be had of Book Co., 4/4A, College Square, Calcutta.

243 M. N. R., Chandannagar.—For emery powder enquire of Kailash Chandra Dutt & Sons, 20 Bonfields Lane and J. C. Coomar, 25-26 Clive Street, both of Calcutta. Wants to buy "mowah" seed oil.

244 K. D. S., Rayadurg.—The address of the firm dealing in seeds as quoted by you is complete. For the books required enquire of Thacker Spink & Co., 3 Esplanade East, Calcutta. You may consult *Gardener's Magazine*, 2 Naba Roy Lane, Calcutta.

245 N. L. D., Dacca.—To communicate with querists write them with number and initials under care of **Industry** when your letters will be duly redirected.

TRADE MARKS & INVENTIONS

Your Trade Marks, Labels Designs and Inventions can be registered and patented from the Government of India at very reasonable rates. Please Apply to:—

THE ACME TRADING & MFG. CO.,
Delhi.

FOR THE COLD SEASON.

Woolen Danigol & Snuff and Navy Blue Colours over Coat Rs 12/8-; Sporting Coat Rs 9/-, Serge Coat Rs 9/8-, Cloth—Swadeshi, Finally Superior Goods are smart looking serviceable and cheap $\frac{1}{2}$ with order.

MAHINDRAKAR BROS.,
Bombay No. 4, or 12, & Poona City.

Notices and Reviews.

Calendars.

We are indebted to Messrs. S. R. Saha & Bros., Lions Gate, Puri in respect of a pair of calendars from their Medicine Dept., and **Calico Dyeing.**

All kinds of colours and chemicals for dyeing wool, silk, cotton and for making ink etc., are imported by the Bengal Dyeing and Calico Printing Works, 2, William's Lane, Calcutta.

A Novel Toy.

Attractive and novel toys are manufactured by Messrs. R. P. & Sons, Sidheswari, Benares City.

Toilet Soaps.

We have received with thanks an assorted box of toilet soaps from Annapurna Soap Factory, Benares City. The soaps are nicely scented and may be given a trial.

Powdered Spices

Of use in the kitchen room are the powdered spices of Messrs G. B. Bhusari, Keshbagh Road, Mahal, Nagpur. These may be judiciously employed to season and flavour foods in cooking.

Dental Preparations.

Messrs. K. Venkat Rao & Sons, Court Road, Mangalore are the sole distributors of Dr. Kadey's Arom.—Antiseptic Tooth Powder and Neo-Thymol Dental Cream.

Help to Maternity.

Kheeravardhani is the name of a preparation for increasing the milk of mothers who are troubled with deficiency. It may be had of The Andhra Business House, Kottapeta, Vizagapatam.

Ink Dept., respectively.

Messrs. Radhe & Co., General Merchants, Pataly, Calcutta have put us under obligation by sending us a multi-coloured calendar.

Our best thanks are due to the Bombay Mutual Life Assurance Society Ltd., 31, Jackson Lane, Calcutta for a useful calendar.

Two Booklets.

English-Urdu Chemical Glossary containing Urdu equivalents of English chemicals. By Mr. Gianchand Hotchand, P.O. Bhiria, (Sind).

It will assist many in identifying the various ingredients.

The Book of Arts and Mysteries. By Professor, Mail Order Globe, Bhiria (Sind).

It contains many simple recipes.

A Writing Book.

Got up on a new model the "Futurist" writing book will appeal to many students. Mr. S. V. Vyas, Bandukwala Bldg., Pydhonie, Bombay is the publisher.

Glass Bangles.

We are extremely delighted to receive 12 assorted pairs of choice glass bangles from Messrs. Bhagwat Bros., Sadashivpeth, Poona City. The bangles are of different colours and design while their varieties are numerous. We wish this purely swadeshi enterprise every success.

A Pain Balm.

"Amrutranjan" is the name of the pain balm, manufactured by Messrs. S. R. Saha & Bros., Amrutranjan Depot, Puri.

School Badges.

Excellent are the celluloid badges prepared by Messrs. A. R. Qureshi, Import and Export Agent, Ahmed Lodge, Gujrat, Punjab. These should be in great demand amongst students, volunteers and the like.

Patent Medicines.

Fever pills, cough tablets, tooth ache powder and an ointment for skin diseases etc., are prepared by Mr. P. C. Nath, 90, Luker Road, Allahabad.

Betel Nut and Tobacco.

Finely shredded Betel nut and pe funned Tobacco are the specialities offered by The Lall Arya Vedic Practical Co., Kurauli Manjuri.

Carbon Papers.

German carbon papers are imported in large quantities by The Fancy Jewellery Co., Shanmuganathapuram P.O. Ramnad Dist., S. India.

German Trade Paper.

We understand that The Students' Co-operative Stores, Agra, publishers of the Commercial Directory, have taken up the agency of the well-known German trade paper, Uhersee Post.

Commercial Education.

Much that is of practical utility may be acquired by going through the course offered by The Business Training College, 95, Islampur Road, Dacca.

A Metal Polish.

It is claimed for the Shalimar Universal Metal Polish that it possesses cleaning and polishing qualities which apply to all metals—silver, copper, brass, zinc, etc. It may be had of The General Stores, Ram Galli Street, Lahore.

Trade Enquiries.

[To communicate with any party write him direct with name and address as given below, mentioning **Industry**.]

23 Bhupesh Chandra Chatterjee, Gopalpur, Kamrup P.O., Dist Nadia—Can supply 'akanda' cotton

49 B. B. Calcutta—Wants to be an apprentice in a reliable firm that takes care of forest for dealing in charcoal, log and timber

50 B. K. Roychoudhury, 8A, 37th Street, Rangoon—Desires to take agency of silk goods and hosiery

85 A. Mitter, The Hospital Deoghar, Deoghar S. P., E. I. Ry.—Can supply pigs

90 The General Stores, Kotah Pulkandy, Rajputana—Want to be put in touch with exporters of horn and hoofs, honey, feathers, linseed, garlic, onion, chulphes, animal bones and skins and Indian herbs and roots in Bombay and Calcutta

93 Dr. Raj Bahadur Saksena, Pathwan Belangan, Agra—Wants supply of quince seeds

101 K. E. Kotwal, Forest Bungalow, Civil Lines, Godhra—Can supply untanned crocodile skin

105 Deoram Hiranman, Bhavani, Faizpur, E. K.—Is desirous of buying 'Makhwa' seed used in snuff at Madras

116 Nagendra Mohan Majumdar, 19/B, 'Ultadighi Main Road, Calcutta—Can supply 'chaulmogra' seed and oil

117 C. Gnanaprakasam Pillai, 2129 Sahib Street, Velhpalayam, Negapatnam—Desires to be put in touch with importers of Austrian glass beads and glass bangles of Bombay

136 Mg Nyun, Katha, Upper Burma—Wants to buy fruits of *Cocculus Indicus* and *Anamita Cocculus*

141 The Three Star Trading Co., Lahore—Want to be introduced to pearl merchants of Basra

154 Moses Bhascy Nagpur, C. P.—Wants to learn match industry

162 B. D. Bhargava & Co., Egerton Street, Darwara, Delhi—Want to be put in touch with firms of South Africa and Egypt who import Indian piece-goods and spices

173 Ram Ganesh Hardikar, West View, Nasik—Wants to sell the design of a combined inkstand, pencil rack and a calendar, already registered at the Patent Office, Calcutta

175 J. M. Bose, Narancheria, S. Sylhet—Wants an expert in juice preserving, syrup making and canning

176 Shripati Nath Sinker, 88, Narkeldanga North Road, Calcutta—Can supply ghee and pure Murshidabad silk fabric and can purchase jute and food grains

191 Shaik Ahmed, Malvan—Wants to be put in touch with firms dealing in bamboos

213 K. P. Singh, Katra Bazar, Sangarh—Can supply tamarind logs used in oil mills

287 Kanwar Bhan Ishwar Chand, Near Congress Committee Office, Lyalpur—Wants to be put in touch with suppliers of cardamom, carraway, cinnamon and cloves

288 Mg Nyun, Katha, U. Burma—Wants peyote a species of cactus found in Mexico

302 B. R. Andson, C/o Raxaul Trading Agency, Raxaul, B & N W Ry.—Can supply salt-cured lizard skin

305 Abdullah Vah Mahomed, P.O. Box 233, Napier Road, Karachi—Desires to buy horse hair, goat hair, cow tail hair, horns and hoofs of animals and rabbit and hare skins

306 The Indo French Novelty Stores, Moga, Punjab—Desire to buy feathers of all birds, hair, and bristles, horns and hoofs, massagate, bloodjasper, Myrobolans, musk saffron, soap-nuts and gallnuts

314 Malik Hiranand & Sons, Bunder Road, Karachi—Wants supply of kingfisher's feather

338 C. Sen, P.O. Sonari, Dist Sibsagar—Can supply agaru wood in very large quantities

343 Krishna & Co., G. B. Shrivastav, Gwalior—Can supply forest products such as honey, cumseed, ghee, etc.

MAY ISSUE OF INDUSTRY.

(IN THE PRESS.)

The May issue of **Industry** which will be published on the last day of the month will contain among other things illustrated article on **Varnish Making**, Possibilities of Afghanistan etc besides the usual features **Small Trades and Recipes**, **Formulas**, etc., etc. Any friend of our subscriber may have a sample copy on application to the Manager

Industry.

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Industry is published at the end of every month

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

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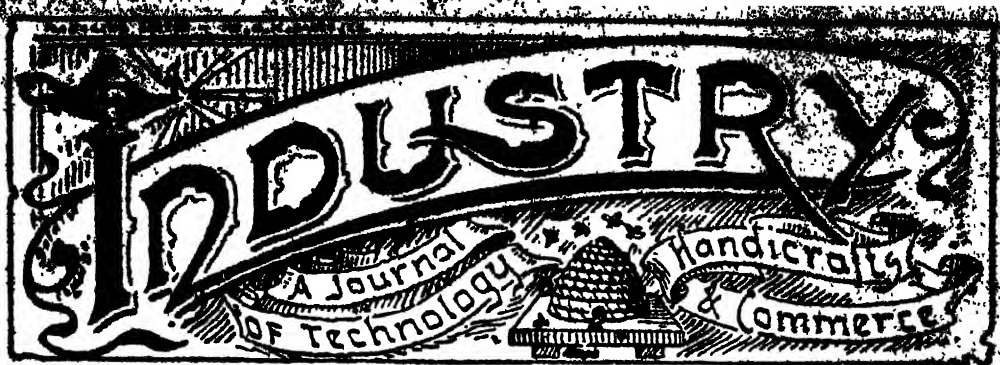
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KESHUB BHABAN, SHAMBAZAR, CALCUTTA



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CALCUTTA, MAY, 1926.

No. 194.

LIFE'S CHANCES.

IN every clime, in every age the ambition of the youngmen has been to succeed, to make a name, to achieve distinction, to do better than others. It is the goal towards which presumably aspiring youngmen look with a certain amount of assurance and comfortable anticipation at the outset of their lives.

It does not occur to the ambitious youngman that for every human being who, from a worldly point of view, succeeds hundreds of thousands fail to dissociate themselves from the crowd in any way. The successful man no doubt does better than his fellows and reaps palpable reward in material prosperity or general esteem, while the unsuccessful man drags out an undistinguished and obscure existence in the byways and backwaters of the world, until they disappear unnoticed and unmissed, into the limbo of oblivion.

Mankind is so vast that by the laws of probability it is a million chances to

one that any particular youngman will do exceptionally well in any walk of life which he may choose for himself.

When we first face the problems of existence, few of us do take these things into consideration. And it is well for the motive forces of life and human endeavour that this is so. We are, thereby, not permitted to court paralysis at the start by realising too vividly the true nature of so colossal a gamble.

Serenely we approach the question ignoring the fate of friends and undeterred by the traces of ruin that surround us. For we feel in our hearts that we are to form an exception to the general rule, and that, whatever may be in store for others, for us at least is reserved a splendid destiny.

The odds against us are enormous and the knowledge of this should incline us not to be too downcast ourselves or too contemptuous of others when a blank is drawn.

For the majority of us the sight of success, at one time glittering in the horizon, becomes more dim and visionary with the passage of the years, till at last it fades away altogether into the region of dreams. The once-aspiring youngman who had thought of himself as a thing apart, easily to achieve fame, humbled at length and discouraged, steps till further back, a man of no account, into the rear ranks from which he could never emerge.

We are not speaking, of course, of those whose vitality is entirely exhausted by the mere struggle for existence, nor of those who, by the accident of birth, are automatically, as it were, and from the start extra-ordinarily fortunate, so that they are accorded throughout their careers, a prominence and importance which, in other circumstances, would never have been theirs.

The very lucky and the very unlucky are alike out of the running. We are referring rather to those who depend for their success upon their own exertions,—that multitude whose means are sufficient to command a more or less liberal education, involving the development of a certain amount of intellectual and social ambition, capable of being dashed or destroyed, and whose general grasp of the situation is sufficiently sensitive to make them desire success and cause them to be painfully conscious of failure when it comes.

These are the men and women who have need of some sort of philosophy and consolation when, a voice within them, whispers "Too Late," and there is comfort even for such as these.

It is useless to enquire whether lack of success in such cases, is due to individual shortcomings. But let not the unsuccessful man think that he is also unnecessary.

It is a most important part which he plays in the economy of the universe, for without him success itself would be invisible.

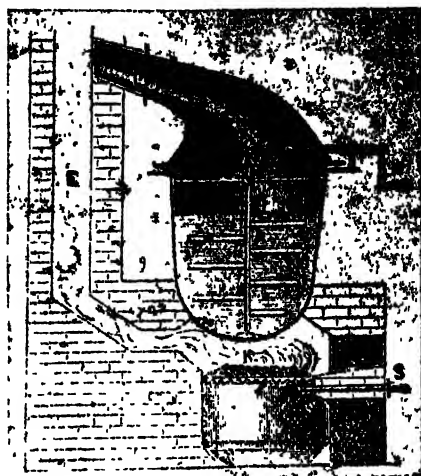
Thousands of young lives, without promise of any sort and middle-aged lives, and whose promise has been unfulfilled—old lives, barren of achievement, looking back upon the wasted and unfruitful years—these, in their legions, with their bitter memories and secret suffering help to form the shadow of back-ground against which more fortunate lives stand out in brilliant relief.

Immeasurable indeed, is the debt which success owes to failure.

The distinctions which men confer upon each other depend entirely upon the contrast between these two states. The one is the complement of the other. A man is said to be "distinguished." Distinguished from whom? Not from his peers, but from the common herd, the great mass of humanity. His very existence, as a man of distinction, depends upon the failure of others.

MANUFACTURE OF VARNISH.

VARNISH is a solution of resinous matter, which is spread over the surface of any body, in order to give it a shining, transparent, and hard coat, capable of resisting, in a greater or less degree, the influences of air and moisture, such a coat consists of the resinous parts of the solution, which remain in a thin layer upon the surface after the liquid solvent has either evaporated away, or has dried up. When large quantities of spirit varnish are to be made, a common still, mounted with its capital and worm, is the vessel employed for containing the materials, and it is placed in a steam or water bath. The capital should be provided with a stuffing box, through which a stirring rod may pass down to the bottom of the still, with a cross-piece to its lower end, and a handle or winch at its top. After heating the bath till the alcohol boils and begins to distil, the heat ought to be lowered, that the solution may continue to proceed in an equable manner, with as little evaporation of spirit as possible. The operation may be supposed to be complete when the rod can be easily turned round. The varnish must be passed through a silk sieve of proper fineness; then filtered through porous paper, or allowed to clear leisurely in stone jars. The alcohol which has come over should be added to the varnish, if the just proportions of the resins have been introduced at first. Great care should be taken in handling the ingredients for the manufacture of varnishes as they are mainly combustibles. It would be advisable to use a separate building for workshop.



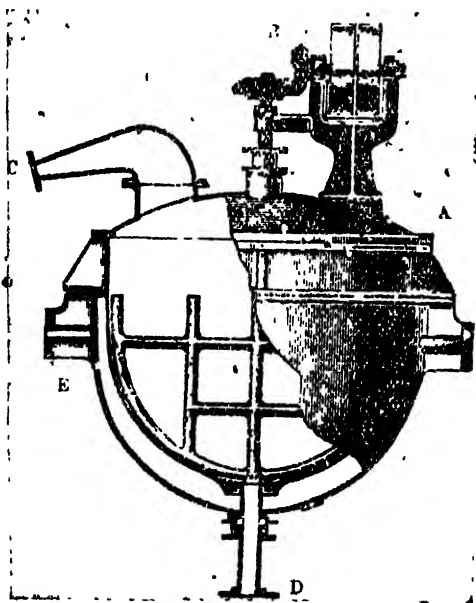
I. K—Oil boiling pan, R—Agitator, M—Crank-Handle, C—Cog-Wheel, H—Hood, E—Chimney, R—Hearth, S—Rod.

Procure a copper pan which will contain from 50 to 80 gallons, as occasion may require when wanted, set it upon the boiling furnace, and fill it up with linseed oil within 5 inches of the brim. Kindle a fire in the furnace underneath, and manage the fire so that the oil shall gradually, but slowly, increase in heat for the first two hours; then increase the heat to a gentle simmer, and if there is any scum on the surface, skim it off with a copper ladle, and put the skimming away. Let the oil boil gently for three hours longer, then introduce, by a little at a time, one quarter of an ounce of the best calcined magnesia for every gallon of oil; occasionally stirring the oil from the bottom. When the magnesia is all in, let the oil

boil rather smartly for one hour; it will then be sufficient. Lay a cover over the oil, to keep out the dust while the fire is withdrawn and extinguished by water; next uncover the oil, and leave it till next morning, and then while it is yet hot, ladle it into the carrying jack, or let it out through the pipe and cock; carry it away, and deposit it in either a tin or leaden cistern, for wooden vessels will not hold it; let it remain to settle for at least three months. The magnesia will absorb all the acid and mucilage from the oil and fall to the bottom of the cistern, leaving the oil clear and transparent, and fit for use. Recollect when the oil is taken out not to disturb the bottoms, which are only fit for black paint.

Set on the boiling-pot with 8 gallons of oil; kindle the fire; then lay the fire

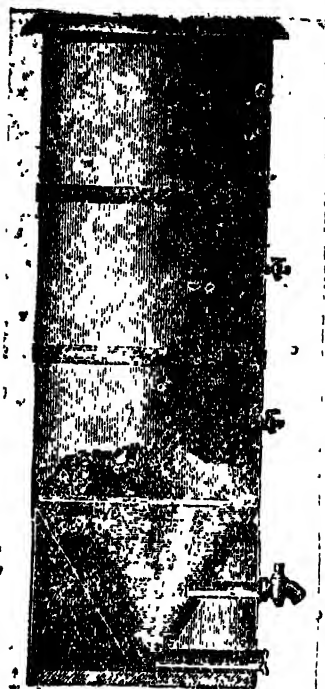
in the gum-furnace; have as many 8 lb. bags, of gum copal all ready weighed up as will be wanted; put one 8. lb. into the pot, put fire to the furnace, set on the gum pot; in three minutes (if the fire is brisk) the gum will begin to fuse and give out its gas, steam, and acid: stir and divide the gum, and attend to the rising of it, as before directed. 8 lbs. of copal take in general from sixteen to twenty minutes in fusing from the beginning till it gets clear like oil, but the time depends very much on the heat of the fire and the attention of the operator. During the first twelve minutes while the gum is fusing, the assistant must look to the oil, and bring it to a smart simmer; for it ought to be neither too hot nor too cold, but in appearance beginning to boil, which he is strictly to observe. Immediately it is ready both should lay hold of a handle of the boiling pot, lift it right up so as to clear the plate, carry it out and place it on the ash-bed, the maker instantly returning to the gum-pot, while the assistant puts three copper ladlefuls of oil into the copper pouring-jack, bringing it in, and placing it on the iron plate at the back of the gum pot to keep hot until wanted. When the maker finds the gum is nearly all completely fused, and that it will in a few minutes be ready for the oil, then the assistant should lift up the oil-jack with both hands, one under the bottom and the other on the handle, laying the spout over the edge of the pot, and wait until the maker calls for the oil. The assistant is then to pour in the oil as before directed, and the boiling to be continued until the oil and gum become



II. Jacketed Pan for oil boiling, A—Dome, B—Cog-Wheel, C—Pipe, D—Outlet.

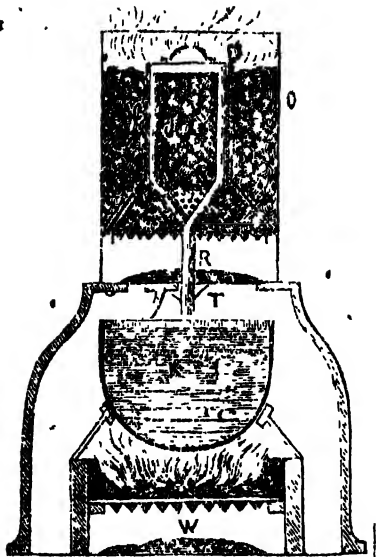
concentrated, and the mixture looks clear on the glass; the gum-pot is now to be set upon the brick-stand until the assistant puts three more ladlefuls of hot oil into the pouring-jack, and three more into a spare tin for the third run of gum. There will remain in the boiling-pot still $3\frac{1}{2}$ gallons of oil. Let the maker put his right hand down the handle of the gum-pot near to the side, with his left hand near the end of the handle, and with a firm grip lift the gum-pot, and deliberately lay the edge of the gum-pot over the edge of the boiling pot, until all its contents run into the boiling pot.

Let the gum-pot be held, with its long bottom turned upwards for a minute right over the boiling point. Great precaution should be taken as the vessel is apt to catch fire; in which case steps should be taken to smother it immediately. The moment the maker has emptied the gum-pot he throws into it half-a-gallon of turpentine and with the *swish* immediately washes it from top to bottom and instantly empties it into the flat tin jack: he wipes the pot dry, and put in 8 lbs. more gum, and sets it upon the furnace; proceeding with this run exactly as with the last, and afterwards with the third run. There will then be 8 gallons of oil and 24 lbs. of gum in the boiling-pot, under which keep up a brisk strong fire until a scum or froth rises and covers all the surface of the contents, when it will begin to rise rapidly. When it rises near the rivets of the handles, carry it from the fire and set it on the ash-bed, stir it down again, and scatter in the driers by a little at a time, keep stirring, and if the frothy head



III. Tank for clarification of Oils by Deposition.

goes down put it upon the furnace, and introduce gradually the remainder of the driers, always carrying out the pot when the froth rises near the rivets. In general, if the fire be good, all the time a pot requires to boil from the time of the last gum being poured in, is about three and a half or four hours; but time is no criterion for a beginner to judge by, as it may vary according to the weather, the quality of the oil, the quality of the gum, the driers, or the heat of the fire, etc; therefore, about the third hour of boiling, try it on a bit of glass, and keep it boiling until it feels strong and stringy between the fingers; it is then boiled sufficiently to carry it on the ash-bed, and to be stirred down

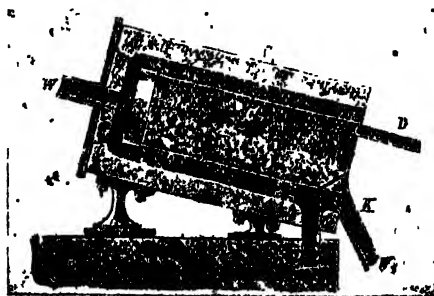


IV. Varnish-Making Plant.

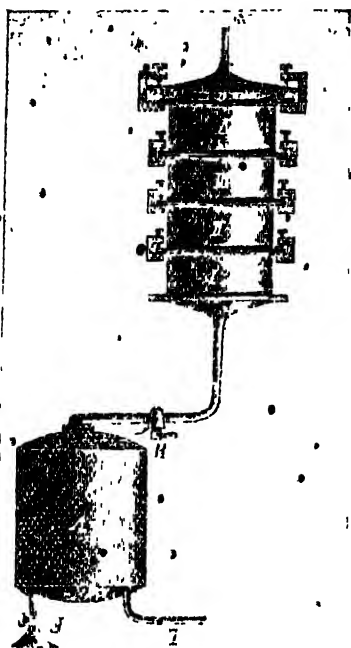
until it is cold enough to mix, which will depend much on the weather, varying from half an hour in dry wintry weather to one hour in warm summer weather. Previous to beginning to mix, have a sufficient quantity of turpentine ready, fill the pot, and pour in, stirring all the time at the top or surface, as before directed, until there are 15 gallons of oil of turpentine introduced, which will leave it quite thick enough if the gum is good, and has been well run; but if the gum was of a quick quality, and has not been well fused, there ought to be no more than 12 gallons of turpentine mixed, and even that may be too much. Therefore, when 12 gallons of turpentine have been introduced, have a flat saucer at hand, and pour into it a portion of the varnish and in two or three minutes it will show whether it is too thick if not sufficiently thin, add a little more turpentine, and

strain it off quickly. As soon as the whole is stored away, pour in the turpentine washings with which the gum pots have been washed, into the boiling pot, and with the *smish* quickly wash down all the varnish from the pot sides; afterwards with a large piece of woollen rag dipped in pumice powder, wash and polish every part of the inside of the boiling-pot, performing the same operation on the ladle and stirrer; rinse them with the turpentine washings, and at last rinse them altogether in clean turpentine. Wipe dry with a clean soft rag the pot, ladle, stirrer and funnels, and other appliances to keep them from gumming up. The foregoing directions concerning running the gum and pouring in the oil, and also boiling of and mixing are, with very little difference to be observed in the making of all sorts of copal varnishes, except the differences of the quantities of oil, gum, etc., the proportions of which should be ascertained in particular cases.

The choice of linseed oil is of particular consequence to the varnish maker. Oil from five full grown ripe seed, when viewed in a phial, will appear limpid, pale



V. Steam Plant for Fusing Resins.

COMMON MASTIC VARNISH.

VI. Varnish Filter.

and brilliant, when clarified it dries quickly and firmly and does not materially change the colour of the varnish when made, but appears limpid and brilliant.

CABINET VARNISH.

Fuse 7 lbs. of very fine gum copal, and pour in half a gallon of pale clarified oil; three or four minutes after, if it feel stringy, take it to a separate place where there is no fire, and mix with it three gallons of turpentine, afterwards strain it and put it aside for use. This, if properly boiled, will dry in ten minutes; but if too strongly boiled, will not mix at all with the turpentine; and some times, when boiled with the turpentine, will mix and yet refuse to incorporate with any other varnish less boiled than itself.

This varnish is chiefly intended for the use of Japanese cabinet painters, coach painters, etc.

Put as much gum mastic unpicked, into the gum pot as may be required, and to every 2½ lbs. of gum pour in 1 gallon of cold turpentine; set the pot over a very moderate fire, and stir it with the stirrer; be careful, when the steam of the turpentine rises near the mouth of the pot, to cover it with a blanket and carry it out of doors, as the vapour is very apt to catch fire. A few minutes' low heat will perfectly dissolve 8 lbs. of gum which will, with 4 gallons of turpentine, produce, when strained, 4½ gallons of varnish; to which add while yet hot 5 pints of pale turpentine varnish, which improves the body and hardness of the mastic varnish.

TO REMOVE STAINS FROM CLOTHES.

Repeated applications of alcohol will remove grass stains from any material.

Traces of mud may be removed from black dresses by rubbing the stains with raw potato.

To remove blood stains, dip the stained fabric in kerosene, and wash thoroughly.

To remove ironrust from linen: if the ground be white, oxalic acid, employed in the form of a saturated solution, will effectually remove fresh iron stains.

Paint stains that are dry and old may be removed from cotton or woollen goods with chloroform. First cover the stains with olive oil or butter.

Red ink stains can readily be removed with alcohol. Methylated spirit can be economically used.

To remove paint spots from clothing saturate the fabric with equal parts of turpentine and liquor ammonia.

FLORAL ESSENCES.

THE chief application of flower abstracts lies in the manufacture of handkerchief perfumes, scents, essences, etc. The process of preparation is essentially the same in every case. Freshly bloomed scented flowers are selected; freed from green stalks and cleaned from dirt and dust. The picked flowers are then digested in spirit where the spirit has not been defined, rectified spirit is to be understood. After a time the liquid is filtered and the scent carefully bottled.

Nicely scented country flowers are often wasted which can be profitably utilised in this way. Prepared at home the floral scents will be concentrated and therefore lasting.

BAKUL.

Take Bakul flowers 8 oz. clean and free from dust; put them in a stoppered phial and pour in 20 oz. cologne spirit. Close the mouth. Leave aside for 3 days; and filter. Again soak 12 oz. fresh flowers in this filtered spirit and leave aside for 48 hours. Finally filter and put in a stoppered phial.

HENA.

Mehndi flower 8 oz; proof spirit 12 oz. Put these two ingredients together in a stoppered phial for 15 days. Wring out the flowers and throw them away. Put in 12 oz. fresh flowers in this spirit and after 7 days filter. Store in a stoppered bottle.

MUSK HENA.

Take 1 an. pure musk; 10 oz. mehndi flowers; 20 oz. spirit. First macerate the

musk in the spirit and put it in a stoppered phial. Throw in the flowers; shake well; close up the mouth and set aside for 10 days. Filter through a filter paper and store in a stoppered phial.

KETAKI.

Procure 6 oz. pollens of Ketaki flowers and 6 oz. tender leaves of the same plant; also 24 oz. proof spirit. Finally chop the leaves. Put all these ingredients into a wide-mouthed stoppered phial for 20 days. Filter through filter paper.

BELA.

Take 16 oz. Bela flower free from stalks and 20 oz. cologne spirit. Put these two ingredients in a wide-mouthed stoppered phial for 48 hours. Wring out the flowers and put in 8 oz. fresh flowers. Set aside for 24 hours and then filter through filter paper. Store carefully in a stoppered phial.

MALLIKA.

Put together 8 oz. Mallika flowers free from stalks and 12 oz. proof spirit into a wide-mouthed stoppered phial. Wring out the flowers after three days and throw in 8 oz. fresh flowers. Leave for 48 hours and then filter through filter paper and store in a stoppered phial.

JOHURI CHAMPAKA.

Take 100 Johuri Champaka flowers and 20 oz. proof spirit. Put the two together into a wide-mouthed stoppered phial for 24 hours. Wring out the flowers, then throw in 100 fresh flowers and set aside for 24 hours. Repeat this

for seven times. Finally filter through filter paper and store in a stoppered phial.

GANDHARAJ.

Take 200 Gandharaj flowers free from stalks and 32 oz. spirit of wine. Put the two together into a stoppered phial for 3 days, and then wring out the flowers. Put in 200 fresh flowers and leave for 48 hours. Wring out the flowers; put in a third lot of 100 flowers and set aside for 24 hours. Finally filter through filter paper.

HASU-NO-HENA.

Put together 16 oz. Hasu-no-hena flowers and 16 oz. spirit in a wide-mouthed stoppered phial for 24 hours. Filter through filter paper; throw away the exhausted flowers. Put in 6 oz. fresh flowers in the same spirit and leave for 24 hours. Repeat this process for 6 times; filter through a filter paper and finally put in a stoppered phial.

CHAMPAKA.

Procure 100 Champaka flowers and then, put in a stoppered phial. Pour 24 oz. spirit of wine into it and leave for 48 hours. Strain the liquid and throw away the exhausted flowers. Put in 200 fresh flowers and leave for 24 hours. Finally filter through filter paper and bottle.

ROSE.

Procure 16 oz. dried buds of Rose (any scented variety) and 20 oz. spirit of wine. Put the two together into a wide-mouthed stoppered phial for 20 days. Filter through filter paper and store in stoppered phial.

TUBEROSE.

Put 8 oz. Tuberose and 12 oz. proof. spirit together into a wide-mouthed phial

for 7 days. Strain and throw away the exhausted flowers. Put 8 oz. fresh flowers into the spirit; close up the mouth and set aside for 15 days. Put in a stoppered phial.

CHAMELI.

Take 12 oz. Chameli flowers free from stalks, put in a wide-mouthed stoppered phial and pour in 16 oz. cologne spirit. Leave for 48 hours, strain and throw away the flowers. Put in 8 oz. fresh flowers, leave for 24 hours, then filter and store in stoppered phial.

JUIN.

Procure 16 oz. single Juin free from stalks and 12 oz. spirit. Put these two together into a wide-mouthed stoppered phial for 24 hours. Strain and throw away the exhausted flowers. Put in 8 oz. fresh flowers, close up the mouth tightly and leave for 24 hours. Finally filter through filter paper and store in a stoppered phial.

KHUS KHUS.

Procure Khus roots; pick them and free them from dirt. Pound them finely. Soak the roots in 16 oz. spirits of wine and put the two together into a wide-mouthed stoppered phial. After a month filter through filter paper and put in a stoppered phial.

JHANTI.

Procure 8 Jhanti flowers free from stalk; put in a wide-mouthed stoppered phial and pour in 12 oz. spirit. Strain after 48 hours and throw away the exhausted flowers. Put in a fresh lot of 12 oz; and filter through filter paper after 24 hours. Finally store in a stoppered phial.

ORANGE.

Procure 8 oz. dried peels of Orange and mince them fine. Soak them in 12 oz. spirit in a wide-mouthed stoppered phial. Close up its mouth and set aside for 1 month. Finally filter through filter paper and store in a stoppered phial.

KANTALI CHAMPAKA

Procure 250 Kantali champa flowers and spirit 20 oz. Put the two together into a wide-mouthed stoppered phial, and close the mouth tightly. Strain after 15 days and throw away the exhausted flowers. Soak a fresh batch of 250 flowers into the spirit and filter after 48 hours. Store in a stoppered phial.

AMBERGRIS.

Put 12 dr. Ambergris in a stoppered bottle and pour into it 3 pints of cologne spirit. Close the mouth tightly and set aside for a month. Finally filter and store in a stoppered phial.

MUSK.

Macerate thoroughly 24 grs. of pure Musk in a stone mortar. Dissolve the same in 16 oz. spirit of wine and put the solution in a stoppered phial for 20 days. Shake once a day for 10 minutes every time. Finally filter and store in a stoppered phial.

BERGAMOT.

Take 4 oz. oil of Bergamot in a stoppered phial and mix into it 30 oz. spirit of wine. Filter after seven days and store in a stoppered phial.

PATCHOULI.

Procure 12 oz. clean and dry leaves of Patchouli and 12 oz. proof spirit. Put these two together into a wide-mouthed stoppered phial; close the mouth tightly and set aside for one month. Then filter

through filter paper and store in a stoppered phial.

CASSIA.

Mix together 4 dr. oil of Cassia and 12 oz. cologne spirit. Put in a stoppered phial for 15 days and shake once a day for 5 minutes. Finally filter and store in a stoppered phial.

CLOVES.

Take 1 lb. picked and cleaned Cloves and 20 oz. spirit of wine. Put the two together into a wide-mouthed stoppered phial for a month. Then filter and store in a stoppered phial.

DOLAN CHAMPA.

Procure 500 Dolan champa flowers. Put them in a stoppered phial. Then add 15 gr. benzoic acid and 16 oz. spirit. Close the mouth and leave for 3 days. Shake the matter gently thrice a day and for five minutes every time. Filter through filter paper and store in a stoppered phial.

LAVENDER.

Take fresh Lavender flowers 20 oz. and spirit 32 oz. Put the two together into a stoppered phial. Close the mouth and leave for 1 month. Filter through filter paper and store in a stoppered phial.

GLOSSARY.

Bakul—Munusops Elengi, Mulsari; Borsali.

Bela—Arabian Jasmine.

Cassia—Fejpat.

Chameli—Catalomon Jasmine.

Champak—Michelia champaca; Chamjaka, Shampang.

Cloves—Labang, Long.

Dolan champa—Plumeria, Kanagala, Gulachin.

Gandharaja—Gardinia or Cape Jasmine.

Hena—Lawsonia, Mehudi, Marithondi.

Jhanti—Barleria, Tadrelu, Kojika

Johuri champa—Magnolia mutabilis.

Juin—Jasmine auriculatum.

Kantali champa—Arbortrys odora
tissimus, Mad
mantri, Manoran
jitam.

Khus Khus—Vetiver, Bena, Pannu,
Valo.

Ketaki—Pandanus odoritissimus,
Keora, Kenda, Talum, Tsah-
tha-pu.

Mallika—Jasme arborescens, Adavi

Orange—Kamla lebu

Patchouli—Pachapata

Rose—Gopali.

Tuberose—Rajanigandha.

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INSECT POISONS.

Beetle or Cockroach Poison.

Cockroaches can be scared away by sprinkling borax near their haunts.

Red Lead	1 oz.
Sugar	1 oz.
Starch	1 oz.
Barium Carbonate	1 oz.
Sugar	1 oz.

Rat Poison.

(1)

Arsenic	1 oz.
Biscuit (powdered)	1 oz.
Ultramarine	10 gr.

(2)

Oil of Aniseed	2 drops
Strychnine	1 dr.
Sugar	1 oz.
Oatmeal	$\frac{1}{2}$ oz.
Ultramarine	10 gr.

Fly Papers.

(a) Arsenical.

Sodium Arsenate	8 oz.
Brown Sugar	$1\frac{1}{2}$ lb.
Water	1 gal.

Make a solution. Dip unsized paper in it, dry and cut into sheets.

(b) Sticky.

Boil linseed oil until it becomes stringy. Dissolve 4 parts of this, 1 part of castor oil, and 1 part of this in bisulphide of carbon. Paint strips or sheets of parchment paper with the mixture.

Ant Poison.

Moss	$\frac{1}{2}$ lb.
Potassium carbonate	1 oz.
Creosote	1 fl. oz.
Water	1 gal.

Rat Poison.

A tasteless, odourless rat poison may be prepared by mixing 1 oz. of barium carbonate with 8 oz. grease. It produces intense thirst and the rats die immediately after drinking.

Rats may be driven away alive by strewing powdered potash into all their holes.

Mosquitos.

Oil of Pennyroyal	2 oz.
Oil of Sassafras	2 oz.
Alcohol	4 oz.

Shake together well in a bottle and spray around with a sprinkler. Mosquitos will be driven off from the place.

By rubbing the following mixture on the hands and face mosquitos will be kept off.

Oil of Sassafras	1 oz.
Sweet Oil	2 oz.

Destroying Flies.

Black Pepper (powdered)	1 dr.
Brown Sugar	1 dr.
Milk	2 dr.

The above mixture is placed on a plate where the flies are most troublesome.

Fly Poison.

Mix 1 part of orpiment in molasses, honey or moist sugar.

Fly Powder.

A dark grey coloured powder is obtained by exposing metallic arsenic to the air. Mixed with sweets, it is used to kill flies.

Our District Possibilities.

QUETTA IN BELUCHISTAN.

INTRODUCTION.

QUETTA Pishin occupies a central situation in the highland part of Beluchistan which is directly under British Administration, on the western side of the water-shed which separates the basin of the Indus on the east from the area of the inland drainage on the west.

The general character of the District is mountainous, the mountains being intersected by long, narrow valleys. All the valleys exhibit similar features and consist of flat plains of alluvial soil in the centre, with a pebbly slope on either side. It is from these beds that the supply of water for irrigation is chiefly derived.

The two dominant factors which present themselves, upon considering the general conditions under which agriculture can be carried on in the Quetta Pishin District, are the presence of mountainous tracts, which can never be made capable of cultivation, and the absolute necessity of perennial irrigation to ensure a harvest. Notwithstanding the fact that the district is one of the best irrigated in the Beluchistan highlands, cultivation over a large portion of its area must always be sporadic. For purpose of dry crop cultivation in Quetta the lands are embanked, the cultivated plots being known as bands. The cultivator divides the year into four seasons.

The largest and the most important crop is wheat which forms the staple food grain of the people, of other food grains maize, *juar*, barley, *mung* are

cultivated. Amongst miscellaneous crop are melons and other cucurbitaceous plants, tobacco and potatoes. Vegetables are grown chiefly in the Quetta tahsil and include egg plant, ladies finger, cabbage, cauliflower, marrows, bean peas, radish, onion, tomatoe, etc.

Fruit culture is one of the most promising industries in the District and is rapidly developing. As a rough estimate the area under orchards and gardens is over 1500 acres. The following fruit trees are cultivated, viz., apricot, peaches, nectarines, pomegranates, mulberries, quinces, pears, almonds, plums, damsons, apples, figs, and a few walnuts. No less than nineteen varieties of grapes are grown in the vineyards.

Horses, camels, bullocks, donkeys, sheep and goats are the principal domestic animals. Fowls are also reared for eggs.

Cultivation can only be practised with certainty, when the scanty rainfall is stored by natural or artificial means. Hence the importance of the Government canals, of the *Karezes*, and of artesian wells. The other sources of supply are the springs and streams. Wherever sufficient water-power exists it is employed for turning water mills.

The District possesses several reserved forests. Juniper, pistachio and tamarisk are the principal trees, grass is also another valuable forest produce.

The essential oil of juniper berries is used medicinally. A distillate from the berries is also used for flavouring

or the defying the flavour of whiskey, brandy, etc.

The pistachio fruit is eaten both fresh and dry. It is considered very nutritive, warm and stimulating but is constipating.

Among minor forest products may be mentioned cumin seed and rhubarb. The male assafoetida plant grows in some parts of the District but the juice is not systematically extracted.

The minerals of commercial values found in the District are coal, chromite, and earth salt. Earth salt is manufactured in the Segi Circle of the Pishin tahsil, and is known either as *khazha malga* or *tirkha malga*. The former is sweet salt. Stone for road metalling can be obtained from the neighbouring hills. Limestone is obtained from the foot of Murdar and from the beds of dry streams and is burnt in kilns with the aid of coal dust.

ARTS AND MANUFACTURES.

Embroidery is common among the Brahuīs of Quetta. It is highly artistic and of many varieties. The goods turned out are sheets, turbans, waist felts, bed sheets, table cloths and veil fronts of silk and cotton. Another sort of embroidery is gold wire work which is chiefly done by the Kandahari and Peshawari women in Quetta.

Large quantities of Baloch rugs which are made at Adraškhan, a place to the south of Herat in Afghanistan and in eastern Persia are imported through Quetta into various parts of India, several firms being engaged in the business. They also deal in Persian pile carpets and Panjleh rugs and their prices

are generally reasonable. The wool which is either of sheep or camels not of goat, is spun by the women and the only implement used is the *charhae*. The loom is equally primitive, although the work turned out is very clear. Felt coats form the principal article of male attire among some of the poorer classes of Kakars.

Brass-vessels are imported from Sind and the Punjab and sold in the Quetta Bazar. The principal articles are cooking pots of various sizes, jugs, cup, dishes, basins, etc.

Many goldsmiths are to be found in the Quetta Bazar and in some of the important villages. They turn out some fine work in Quetta, the best being that done by men from the Hazara District of the Punjab.

Cobblers from Kathiawar carry on a considerable trade in boots and shoes which are chiefly used by people from India residing in Quetta.

Dyers most of whom are Kandaharies, carry on a lucrative business in Quetta, and there are a few shops in other localities. The principal colouring matter used is indigo, which is imported from Sukkur; and the colours in most demand by Afgans are sky blue, black and green. Calico printing with wooden stamps is done in Quetta. The colours generally used are aniline dyes. The manufacture of carbonate of soda has developed very largely in recent years. The bushes from which it is made are *surgul* or *guldar* or *gadagho*; *parkai*, or *matizmai* or *reghat* and *nughrat*.

The bushes are ready for manufacture in September, and October. After

being cut, the bush is left on the ground for 24 hours, and sometimes for as much as 72 hours when it is collected close to a round pit. A fire is lit and it is gradually supplied with green bushes, at the same time taking care to allow no flame to break out and is maintained for about six hours. The heat causes the sap to exude from the bushes into the pit, after which the liquid is allowed to cool for two days and forms into carbonate of soda. The outturn of a pit is generally about 5 maunds at each ignition.

There are no professional potters in the District and pottery is imported into Quetta from Sind. Among the indigenous population earthenware drinking bowls and cooking pots are in general use and are made by the women.

The pink Persian roses, of which most of the hedge-rows in Quetta consist, are generally used for the manufacture of rose water and attar of roses. The industry is in the hands of Punjab Khojas and is carried on during April and May.

For the manufacture of attar of roses, a large copper vessel is used as a boiler. This vessel is connected by a bamboo tube covered with cloth with another smaller copper vessel in which is placed about a seer of sandal or sesame oil. This small vessel stands in a wooden tub fitted with cold water and a slow fire is used. About 20 seers of rose petals are put into 10 seers of water in

the large boiler and the steam is passed through the bamboo tube into the smaller vessel. The water in the tub is constantly kept cool. The oil which floats on the extract is then removed with the palms of the hands. This is the attar.

Rose water is merely a decoction obtained by putting 4 seers of rose-petals in 15 seers of water and boiling them on a slow fire for about four hours.

Among factory industries may be mentioned, breweries, flour mills, sericulture, etc.

TRADE.

In pre British days Quetta lay on the direct route from Central Asia to Sind through the Bolan pass and was an important halting-place. Latterly, however, trade has developed very considerably, and Quetta has become a large distributing centre between the provinces of India on the one hand and Afghanistan and Persia on the other. The trade of the District may, therefore, be divided into three classes each of which will be dealt with separately, namely, foreign trade, internal trade and trade with Indian provinces.

The principal articles exported from British India through Quetta are indigo, iron, rice, cloth, tea, gur, oil, etc., and the imports from Afghanistan consist chiefly of fruit, *ata*, wheat, tobacco, wool, ghee, madder, assafoetida, raisins, almonds, and *postms*. Live animals include horses, sheep and goats.

THE ART OF LITHOGRAPHY.

LITHOGRAPHY is the art of tracing letters, figures, or other design, on stone, and of transferring them to paper by impression. This art was invented about 1795 by Aloysius Senefelder, of Munich.

In printing from an engraving on a copper or steel plate, the ink is delivered from the incisions made therein with the graver or etching needle. An engraving on wood gives its results from the projecting surface of the block, or those parts which are not cut away by the graver. The lithographic process differs from both these modes, the impressions being obtained (by strict attention to chemical affinity) from a level surface.

There are various styles of lithography, but the principle of the art is uniformly the same.

The stone best calculated for lithographic purposes is a sort of calcareous slate, found in large quantities near Bavaria in Germany. Stones much resembling the above have been found elsewhere.

A good stone is porous yet brittle, of a pale yellowish drab, and sometimes of a gray neutral tint. The stones split into slabs varying from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches in thickness which are then cut or squared into the different sizes necessary for use, and the face or upper surface of each is made level. In this state the stones are sent from the quarry; but further preparations is yet necessary to fit them for the immediate use of the artist, and they are either grained or polished, according to the nature of the work they are intended to receive.

Grained stones are used for drawings in the chalk manner, or for imitations of those produced with the black lead pencil. Writings, imitations, of etchings, pen and ink sketches, etc. require the face of the stone to be polished, which is effected by rubbing it with pumice stone and water, or pumice stone dust and water applied with rags.

The two principal agents, used for making designs, writings, etc., on stone, are called lithographic crayons and lithographic ink. They are composed of tallow, wax, soap, shellac, and enough lamp-black to impart a colour to the mass. These are incorporated by a peculiar process of burning in a closely covered saucepan over a fire, and the whole is ultimately cast into a mould and receives the form calculated to fit it for use. The ingredients are the same in the chalk and in the ink, but the proportions are varied. The chalk is used as it comes from the mould in a dry state; but the ink is dissolved by rubbing, like Indian ink, in water, and is used in a pen or camel hair pencil. It is the presence of the soap in this greasy material which renders it soluble in water.

To explain the lithographic process to the layman, let it be supposed that the artist completes a drawing with the chemical chalk just described, upon a grained stone. If, while in this state, a sponge filled with water were passed over the face of the stone, the drawing would wash out, the chalk with which it is made being, as we have seen, soluble in water, by reason of the soap which it contains. Before, therefore,

it is capable of yielding impressions, a weak solution of nitrous acid is poured over it, which unites with and neutralises the alkali or soap contained in the chalk, and renders it insoluble in water. After this usual course is to float a solution of gum over the whole face of the stone, and when this is removed, if a sponge and water be applied to its surface, as before supposed, the drawing is found to be no longer removable, because the chalk with which it is executed is now no longer soluble in water. In this state the work is ready for the printer, who obtains impressions by the following process.

Having thrown with the ends of the fingers a few drops of water on the stone, and spread them with a sponge, so as to wet, or rather damp, the whole surface equally, the printer finds that the water has been imbibed by the stone only on those parts not occupied by the drawing, which, being greasy, repels the water and remains dry. A roller properly covered with printing ink is now passed over the whole stone, which will not even be soiled where it is wet, from the antipathy of oil and water; but the parts occupied by the drawing, being as we have seen, dry and greasy, have an affinity for the printing ink, which therefore, passes from the roller, and attaches itself to the drawing. In this state it is said to be charged, or rolled in. Damped paper is then put over it, and the whole being passed through a press the printing ink is transferred from the stone to the paper, and this constitutes the impression. By repeating in this manner the operations of damping

the stone and rolling in the drawing an almost, unlimited number of impressions may be obtained.

The modes of lithography are, as we have said, various, but the illustration just given will explain the principles of them all. It consists in the mutual antipathy of oil and water, and the affinity which the stone has for both, i.e., in its power of imbibing either with equal avidity. Some of the coloured lithographs now produced are exquisite productions. To ensure success, however, great nicety is requisite in the preparation of all the agents employed in this art.

STAIN IN LEATHER.

THE following stains are common to vegetable tanned leather.

IRON STAINS. One of the defects most commonly met with in all vegetable tannages is the stain produced by iron. The discolouration of leather which is brought about by some form of iron requires special knowledge on the part of the sorter. When vegetable tanned leather comes into direct contact with iron in one or other of its many forms the stain is usually of a bluish or greenish black colour, which has a tendency to turn brown, due to oxidation, on long exposure to air; this change of colour being brought about most rapidly when the leather has been stored under damp conditions. Hides and skins are also particularly liable to be stained with iron prior to being tanned; the stains developing at the tanning process proceeds.

The two classes of stains here mentioned, the one produced before tanning and that produced after the tanning process, behave entirely differently during the preparation of the leather before dyeing. Iron stains which develop during the tanning process, and that owe their origin to some treatment to which the skins have been subjected before tanning, are not capable of being removed by any treatment to which the leather can be subjected as a preparatory process before dyeing and colouring. On the other hand, stains produced by iron after the tannage has been completed are capable of easy removal in the operation of clearing or souring with acid.

Skivers are particularly prone to iron staining, and the sorter must know whether the particular stains on any skin have been produced before or after tanning.

The various forms of iron staining are given a variety of different names by the practical sorter. The so-called "salt" stains are iron stains, and are brought about by the salt used as a preservative on raw skins having become contaminated with iron, which is the actual staining agent. "Blood" stains are also iron stains and are brought about by the putrefaction and fermentation of blood in the skin; the skins being stale before salting, or by the use of insufficient salt in the salting process prior to tanning.

A still further form of iron staining is that which is commonly called "per" or "bate" stains. These stains also have their origin before the tanning process, and are brought about by iron either

in its metallic form or in a soluble condition coming in direct contact with the skins before tanning. "Chemic" or "sulphide" stains are also met with to a considerable extent. These originate from the presence of iron in the sodium sulphide used in the fellmongering or dehairing process, and are particularly noticeable on skins which have been kept in the salted condition previous to tanning for a considerable time, or skins which have been stale where salted. These stains usually take the form of a dark green discolouration, and by comparison with other forms of iron staining are usually much more prominent.

Tea pots should be rinsed out daily with boiling water, and well dried inside and out. The lid should always be left open.

A little vinegar or lemon juice added to the water in which cabbages are cooked improves the flavour and colour, and lessens the odour which arises from such vegetables while cooking.

It is a good plan to wash new stockings before wearing them, for the washing causes a slight shrinkage and makes them wear better.

If the wick of a candle burns out, or collapses, push in a match long enough to reach the bottom and show about one-eighth of an inch above the wax. Light this, and it will last as long as there is wax.

To wash black cloth garments, add a table-spoonful of vinegar to every gallon of water; wash in hot—not boiling—water, with soap. If very dirty, use turpentine instead of vinegar, rinse thoroughly, put into strong blue water, leave for six hours, and dry without fire or sun.

Small Trades & Recipes.

Printing Ink.

The following recipe for preparing printing ink will yield good product.

Mix between rollers 16 pounds of prepared linseed oil, 5 ounces of pulverized indigo, or a like quantity of Berlin blue, and 8 pounds of finest lamp black. The linseed oil is used hot.

Preserving Honey.

Honey contains on an average 1 per cent. of formic acid. Observing that crude honey keeps better than that which has been clarified the addition of formic acid has been found to prevent fermentation without impairing the flavour of the honey.

Match Composition.

	By Parts
Glass	8.77
Glue	7.12
Potash bichromate	5.59
Potash chlorate	46.76
Ferric oxide	4.09
Manganese	13.07
Sulphur	7.41

Making Ivory Soft and Flexible.

Place the ivory articles in a solution of phosphoric acid of 1.13 specific gravity and allow them to remain in it until they have assumed a transparent appearance. Then take them out of the acid, wash them carefully in water, and dry them between soft linen. They are now as soft as thick leather, become hard on exposure to the air, but regain their

plasticity in warm water. Weaker phosphoric acid than the above has no effect.

Cutting Glass Jars.

To cut glass jars fill the jar with lard oil to where you want to cut the jar; then heat an iron rod or bar to red heat, immerse it in the oil; the unequal expansion will crack the jar all round at the surface of the oil, and you can lift off the top part.

Freezing Mixture.

An efficient freezing mixture may be made by using acids to dissolve the salts. The cheapest, and perhaps the best of these for ordinary use, is that current in France for making dessert ices, etc. It consists of coarsely powdered Glauber's salt (sulphate of sodium), on which is poured about two-thirds its weight of hydrochloric acid. The mixture should be made in a wooden vessel. When the substance to be cooled is placed in the mixture, the whole should be covered with a blanket. The above combination produces a degree of cold 30 deg. below freezing.

Headache Essence.

Camphor	2 oz.
Liquor of Ammonia	2 oz.
Oil of Lavender	4 dr.
Rectified Spirit	14 oz.

This headache essence is very fragrant, stimulant and rubefacient.

INDIA'S INDUSTRIAL PROGRESS.



Weaving Industry In Assam.

To resuscitate and improve the hand-loom weaving industry of the province, a weaving master was entertained as long ago as 1912 and he was placed under the control of the Director of Agriculture. On the recommendations contained in the reports on the Silk Industry of the Province the Government of Assam created the post of Weaving Superintendent in July 1920.

With the main object of devising suitable and simple labour saving appliances for cotton and silk weaving, for silk reeling, twisting, finishing and other preparatory processes and for training the youths of the province in the up-to-date methods of weaving Government Weaving Institute was started in August 1920 with a dozen students.

In September last the Government were pleased to sanction the appointment of a Dyeing Assistant to teach dyeing and calico printing systematically. The Weaving Mechanic was sent to Benares to learn the methods of silk finishing last year.

With the training of a batch of students, peripatetic parties were created in order to popularise the improved methods of weaving and preparatory processes in the distant villages.

The parties have succeeded in introducing about 1000 fly-shuttle looms all over the province. Many poor agriculturists and others are thus enabled to supplement their income and they are grateful to them.

The Government Emporium and Central Stores at Gauhati has also been rendering very valuable help to the parties and the public by supplying yarn of very good quality and weaving accessories. It also find a market for their finished product. It is helping a number of ex-students by finding work for them and also a number of poor villagers by placing orders for fabrics and in effecting ready sale of their finished products. The Emporium is capable of bringing immense benefit to the province.

Kossa Silk Industry of C. P.

The Kossa Silk Industry of the Central Provinces is capable of development. Sometimes it is known as Kassi Silk but it is locally called Kossa Silk. Its possibilities of development are by no means small. The fabric is strong and as labour is cheap many villages in the Chattisgarh District of the Central Provinces carry on the weaving of this fabric. Raigarh on the Bengal Nagpur Railway is the principal centre for the weaving of this fabric. The silk is obtained locally in the district, in the forests. Kossa silk cocoons are usually much larger in size, in comparison to that produced on the mulberry tree of the size of hen's egg, and is of light drab colour. Generally, it is woven according to local demands chiefly into "sarees" and shirting, but now and again a thicker fabric is produced.

SCIENTIFIC AND TECHNICAL TOPICS.

Photos without Films.

An invention that may revolutionize photography, and, incidentally, make it cheaper by seventy-five per cent. is engaging the attention of the scientific world.

The idea, which has been perfected by a South African chemist, is based on the principles of reflected light and involves doing away with films and plates.

Instead of films or plates a special sensitized paper will be used. The image is developed in fifty seconds, and the sensitized paper itself comprises the negative, ready for immediate use. The prints are made in an apparatus in which the image is reflected on to ordinary bromide printing paper placed beneath the lens.

A recent demonstration, in the course of which a street scene was photographed showed that by the new method pictures can be taken and printed in three minutes and fifteen seconds. The apparatus facilitates the making of copies from old photographs, while enlargements can be made automatically by adjusting the focus of the camera.

Growing Gardens with Gas.

Fertilising the air instead of the soil is the newest method of speeding up the growth of plants. For this purpose carbonic acid was used in a series of recent experiments with striking results. The

gas is absorbed by the green matter of the leaves, and promotes the growth of the plants. The percentage of gas required is far below the limit where it would be injurious to health.

Scientists explain that the air is very poor in carbonic acid. But ages ago when the earth was covered with the forest that are now coal mines, the atmosphere was rich in this gas. This fact suggested the idea of making the soil fertile by subjecting it to "gas attacks." The gases escaping from factories, but more abundantly from blast furnaces, and which hitherto had been wasted, contain 20 per cent. carbonic acid. It was from this source that the gas for the experiment in intensive gardening was obtained. At first three green houses were erected, one of which served as a testing room while the two others were used for checking purposes. In the testing room the gas, purified of sulphur, was distributed by means of punctured piping. After a few days there was much more luxuriant vegetation in the testing room than in the checking rooms. The tomatoes in the testing room were twice the size of the others. The "gassed" cucumbers were very big and green. It is possible, therefore, that before long carbonic acid work for supplying agriculture will be a common feature in industrial districts as gas works are to-day.

A Mystic Plant.

A new plant, the juice of which is said to produce visions and clairvoyant powers in those who drink it, has been the subject of a remarkable series of experiments undertaken by a French chemist. It is named "peyote," and is a rare species of cactus found only in Mexico.

The experiments appear to leave no doubt that the juice of the plant induces clairvoyancy even when taken in only the smallest quantities. After swallowing the juice a person feels overcome with a desire to shut his or her eyes and to fall into a trance-like state, in which wonderfully coloured plants, trees, animals, and landscapes pass before the vision like a cinema film.

A woman who recently allowed herself to be experimented on accurately described the contents of a room in which she had never been. She could describe people unknown to her but known to the investigators, while she was also successful in several thought-reading tests.

The effects of the drug last only a few minutes, and there are said to be no unpleasant consequences from taking it.

Fishing By Telephone And Wireless.

Apparatus somewhat in the nature of a telephone is used by the herring fishermen in Norway, to locate shoals of fish. A microphone is attached to a sunken wire and it is stated that the movement of the shoal is audible through a telephone receiver in the boat.

Aeroplanes used to locate shoals of fish off the Californian coast have increased the catch by 20 per cent. Trawl-

ers are called to the spot by wireless, and announcements regarding the catch are sent ashore by the same means, so that the market and the canneries may be prepared.

A Bottle Brain Wave.

The latest aid to commerce is an automatic machine that fills, seals, and labels bottles at great speed and with unfailing accuracy.

A machine of this kind, which has just been placed on the market, can fill and seal over 7,000 bottles in an hour. Liquids of any consistency, including syrup, sauces, and salad-dressing, can be bottled in this way. Each container is filled only to the height required and bottles that are cracked or otherwise unsuitable are rejected by the machine.

Perhaps the most wonderful part of the mechanism is the labelling apparatus. This picks up a label, moistens it, sticks it firmly round the jar or bottle, and then wipes it clean and dry. The sealing is done with new hermetic caps, which can be removed by the fingers.

Ascertaining Sex Before Birth.

What is claimed to be an efficient and simple test for ascertaining sex before birth has been discovered by an American Scientist. A few drops of methyl green dye changes the colour of diluted blood to which has been added hydrochloric acid and an oxidising solution. It is claimed that the blood from females turns green and blood from males becomes red.

A laborious test of sex, requiring the use of several chemicals and lasting

for a long time, was invented some time ago by a Russian genitist and is being used in Russia to forecast the sex of unborn children.

Steel's test, however, has the advantage of simplicity and promises to be more certain in its results. It is stated that the test might be of use in criminology and may aid biological investigation by showing the changes in blood due to the transplantation of glands.

Trials have been carried out with the blood of pigeons, fowls and cattle, and about ninety per cent proved successful.

Wool From Wood.

Experiments fraught with great possibilities for the British textile trade have lately been carried out by leading firms in Lancashire and Yorkshire. They concern the production by artificial means of a new wool fibre, arrangements for manufacturing which on a large scale have already been made.

Known at present as "sniafil," the new synthetic wool is the invention of an Italian. In appearance it is a downy, silk-like substance, and it is said to have the textile strength of real wool.

While it is unlikely to replace real wool, "sniafil" is expected to influence the production of the cheaper grades of clothing, the price of which will probably be substantially reduced.

Electrical Treatment Of Seeds.

Various experiments have been started to test the utility of electricity in crop production, but with negative results. In some cases electrically treated tomato seed has taken longer to germinate than untreated seed. The latest available results show that seed treatment has no well-marked effects on the in an electrolyte of brine and exposed to subsequent character or yield of the plants. In most cases seeds were kept

the action of the current. The high-tension electric discharge has resulted in increased yields of a number of crops when treatment was applied continuously throughout the growing season. However, seed treatment by electrical means are for the present in the experimental stage.

Industrial Uses Of Casein.

Casein is of rapidly-growing industrial importance. This is largely a result of the recent advance on the manufacture from casein of plastics, such as galalith, and their use as inexpensive and most satisfactory substitutes for many materials, some of which are rare and costly, like Chinese jade, lapis lazuli, ivory, ebony, amber, tortoise shell, and coral. These plastics provide splendid imitations of natural horn and as hard rubber substitutes are preferable to ebonite and vulcanite for many purposes. For the manufacture of all kinds of electrical fittings used in radios, telephones, aeroplanes, automobiles, and so on they are admirably suited because of their high electrical resistance. Galalith is odourless and non-inflammable; it can be dyed in numberless varieties of colours and brilliantly polished; and in view of the ease with which it can be worked by methods similar to those employed for natural horn it can be manufactured into countless inexpensive articles. In addition to its use for the manufacture of plastics, casein has been extensively employed in food and medicinal preparations; and in the paper, adhesive, paint, and other industries its sundry applications are legion. It makes adhesives of the very best for aircraft and woodworking, is a constituent of nearly all the cold-water paints most frequently used in many countries, and associated with clays, alum and lime, gives a mixture par excellence for the production of especially high-grade paper for half-tone illustrations.

FORMULAS, PROCESSES & ANSWER.

Talmakhan.

433 K. B., Roorkee.—Asks what is the mode of application of Talmakhan?

The dried herb, seeds, and roots are used. They make a demulcent, diuretic, and cooling bitter tonic.

(1)

Talmakhan	1 ounce.
Boiling water	1 pint.
Boil for 10 minutes and strain	

dropsy.

(2)

Dried leaves of talmakhan 2 oz
Vinegar 1 bottle
Macerate for 3 days, press and strain. A demulcent diuretic.

(3)

Talmakhan root	1 oz.
Water	1 pint
Boil for 10 minutes. As a diuretic.	

Sabadilla Vinegar.

426 U. M. F., Khurda.—Wants recipe for *sabadilla* vinegar.

By Parts

Crushed <i>sabadilla</i> seeds	5
Alcohol 90 p.c.	5
Acetic Acid 30 p.c.	9
Water	30

Silicating Soaps.

33 K. B., Roorkee.—Requires hints for silicating soaps.

The method of incorporating silicate of soda in soaps is very simple. The soap to be filled is run into a crutcher,

heated by steam until it is pasty, and then the silicate is added.

It is always advisable to have a test sample made with the soap to ascertain what proportion and what strength of sodium silicate solution is best suited for the grade of soap it is desired to produce. It is important that the soap to be "silicated" should be distinctly alkaline (i.e., have a distinct caustic taste), or the resultant soap is liable to become like stone with age. The alkaline silicate of soda (140 deg. Tw., 59.5 deg. B) is the quality most convenient for yellow soaps; this may be diluted to the desired gravity by boiling with water. For a reduction of 3-4 per cent. fatty acid content, a solution of 6 deg. Tw. (4 deg. B.) (boiling) is most suitable, and if the reduction desired is greater, the density of the silicate solution should be increased. In some instances 140 deg. Tw. (59.5 deg. B) silicate may be added; experiment alone will demonstrate the amount which can be satisfactorily incorporated without the soap becoming "open," but one-tenth of the quantity of soap taken is practically a limit, and it will be found that the temperature should be low; the same quantity of silicate at different temperatures does not produce the same result. Various other strength of sodium silicate are employed, depending upon the composition and body of the soap base—neutral silicate 75 deg. Tw. (139.4

deg. B.) also finds favour with some soap makers.

Properties of Zinc and Lead.

447 S. M. A. R., Kyankse --Wants to learn the properties of zinc and lead.

Zinc is a bluish-white metal having the sp. gr. 6.9; tough (under some circumstances, brittle) when cold, ductile and malleable at from 100 deg. to 150 deg. C; brittle and easily pulverised at 205 degree; fuses at 433 deg; at a white heat it boils, and sublimes unchanged in closed vessels; heated to whiteness in contact with the air, it burns with a brilliant green light, and is converted into oxide. It is very soluble in dilute sulphuric and hydro-chloric acid, with the evolution of hydrogen gas. It is little acted on by the air, even when moist. The salts of zinc are colourless.

Lead is a white metal with a bluish-grey tinge; its sp. gr. is 11.25, or, after it has been poured into water, 11.36; it is but little increased by hammering. It is soft and tough, may be cut with a knife, and leaves a streak upon paper. It can be beaten into foil, but not drawn into wire. When melted repeatedly it becomes hard and brittle, probably owing to the formation of a small quantity of oxide; it is also rendered brittle by the presence of antimony, zinc, bismuth, arsenic, and silver. It crystallises in octahedra. Lead melts at 327 deg. C; but volatilises only at a bright red heat. It is scarcely at all attacked by sulphuric or hydrochloric acids, but dissolves in nitric acid. It oxidises superficially in the air, a bright freshly-cut surface quickly tarnishing.

Bleaching Beeswax.

341 M. C., Peshawar.--Enquires how to bleach beeswax.

Pure white wax is obtained from the ordinary beeswax by exposure to the influence of the sun and weather. The wax is sliced into thin flakes and laid on sacking or coarse cloth, stretched on frames, resting on posts to raise them from the ground. The wax is turned over frequently, and occasionally sprinkled with soft water if there be not dew and rain sufficient to moisten it. The wax should be bleached in about 4 weeks. If, on breaking the flakes, the wax still appears yellow inside, it is necessary to melt it again and slake and expose it a second time, or even oftener, before it becomes thoroughly bleached, the time required being mainly dependent upon the weather. There is a preliminary process, by which, it is claimed, much time is saved in the subsequent bleaching. This consists in passing melted wax and steam through long pipes, so as to expose the wax as much as possible to the action of the steam; thence into a pan heated by a steam bath, where it is stirred thoroughly with water, and then allowed to settle. The whole operation is repeated a second and third time, and the wax is then in a condition to be more readily bleached.

Bleaching Shellac.

The same gentleman also wants to know the process of bleaching shellac.

Any quantity of yellow shellac, previously broken in small pieces, is conveyed into a flask, alcohol of 0.83 sp. gr. poured upon it, and the whole heated on

the bob until the shellac is dissolved; upon this so much coarsely powdered animal charcoal is added to the solution that the whole forms a thin paste; the flask is closed, not quite air-tight, and left so for some time; exposed to the sun; and in 8 to 14 days a small sample is filtered, sufficient to ascertain whether it has acquired a light yellowish brown colour, and whether it yields a clear, pure polish on light coloured woods. If this be the case, it is filtered through coarse blotting paper, for which purpose it is best to employ a tin funnel with double sides. The portion which first passes through the filter may be preserved separately, and used as a ground or first polish. Then some more spirit is poured over the charcoal upon the filter, and the solution used as a last coating. The solution of shellac purified by animal charcoal has a brown yellow colour, but it is perfectly clear and transparent; when diluted with alcohol, the colour is extremely slight.

Removing Tattoo Marks.

293 B. C., Quetta.--Requires some hints for removing tattoo marks.

These are said to be removable by the application of a paste of salicylic acid and glycerine. A compress is applied over the paste, and the whole secured with sticking plaster. After about 8 days the paste is taken off, the dead skin removed, and the application of the paste repeated, if necessary thrice.

Waterproofing Canvas.

329 K. V. R., Madras.--Wants a simple recipe for waterproofing canvas.

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For this purpose a solution containing equal parts by weight of gelatine and chrome alum, will be required. It is not advisable to mix more of the solution at once than is sufficient to give the canvas one coat, as if the mixture once sets it cannot be reliquefied like a plain solution of gelatine, and hence, if the quantity of canvas to be waterproofed is small, it would, perhaps, be preferable to coat with plain gelatine solution until quite impervious to cold water, and then to thoroughly soak for, say, 24 hours, in a strong solution of chrome alum.

Renovating Linoleum.

403 S. S., Katmandu.--Asks how linoleum can be renovated.

Wash the linoleum with a mixture of equal parts of milk and water, wipe dry, and rub in the following mixture by means of a cloth rag; yellow wax, 5 parts; turpentine oil, 11 parts; varnish, 5 parts. As a glazing agent, a solution of a little yellow wax in turpentine oil is also recommended.

Removing Ink Stains From Paper.

396 K. V. S. R., Secunderabad.--Requires some hints for removing ink-stains from paper.

To remove ink stains from paper or parchment make a solution of oxalic acid, and keep dabbing this upon the stains until they disappear. When clear of stain, press between clean white blotting paper, moisten several times with water, and dry each time with clean blotting paper with a clean white cloth to remove the excess of oxalic acid. Place between the blotting paper and put under equal

pressure allowing the parchment several days to dry. A solution of almost any acid will remove ink stains from paper, the best to use being either oxalic or citric acid. Chloride of lime is often recommended.

Animal Charcoal.

3510 V. D. G., Karar.—Asks how animal charcoal is prepared?

When bones are heated in a retort or crucible, the organic constituents are decomposed and carbonised. A mixture of combustible gases is given off, which do not condense on cooling, and others, which condense in the form of a heavy oil, called bone oil, and also much water containing tarry water and ammoniacal salts in solution. The residue in the retort or crucible consists of finely divided carbon in intimate mixture with the inorganic constituents of the bones: this mixture constitutes ordinary bone black, or animal charcoal, as it is sometimes called.

The process, as worked on the large scale, is carried on in different ways, according as it is desired to collect the volatile condensable portion of the distillate, or to allow it to escape. In the latter case, when it is required to obtain only bone black, the apparatus employed is of a very simple nature, and the amount of fuel needed is comparatively small. The carbonisation is effected in fireclay crucible, 16 in. high and 12 in. in diameter.

These are to be preferred to crucibles made of iron, which were much

used at one time, since they do not lose their round form when subjected to a high temperature; in consequence of this, they fit more closely together in the furnace, less air can penetrate, and therefore less of the charcoal is consumed by oxidation. The furnace is on ordinary flat hearth having a superficial area of about 40 sq. yards, and is covered in with a flat arch, all of brickwork. The fireplace is situated in the middle of the hearth; the crucibles are introduced through doors in the front, which are bricked up when the furnace is filled; each furnace holds eighteen crucibles. The crucibles, filled with the coarsely broken bones, are covered with a lid luted on with clay. To economize fuel, the furnaces should be in a row, and placed back to back.

When the furnace is filled and the doors are bricked up, the heat is slowly raised to redness, at which point it is kept for six or eight hours. The combustible gases are evolved and consumed in the furnace as soon as the bones begin to decompose, and by this means so much heat is produced that only a small quantity of fuel is needed to maintain the required temperature. When the carbonization is complete, the doors are taken down and the crucibles removed to cool. The heat must be kept as uniform as possible throughout the process. When the charcoal in the crucible has become perfectly cool, it is removed and crushed.

Bronze Paint For Iron.

579 A. C. A. N., Madras.—Wants a good recipe of bronze paint for iron.

(1)

The gold-like paint with which the steel trunks are gilded may be prepared according to the following recipe.

Ivory black	1 oz.
Chrome green	2 lb.
Chrome yellow	1 oz.
Good Japan	1 gill.

Grind all together and mix with linseed oil.

(2)

Do not mix the gold powder together, but go over the article to be gilded with the size alone, giving an even and moderate coating. Let it dry (which will not take long) till it is just sticky, or, as gilders call it, "tacky." Then over a sheet of smooth writing paper dust on the dry gold powder by means of a stout, soft, sable brush.

Indigenous Plants.

329 P. C. B., ooghly.—Wants to know about *Cocculus Indicus* and *Vitex Pseudocarpus*.

Anamirta cocculus is ordinarily known as *Cocculus Indicus*. It is found in Southern and Eastern India and Burma. The poisonous berries constitute the *cocculus indicus* of commerce, which is the source of picrotoxin, a highly poisonous, crystallizable bitter principle. The fruits also contain about 50 per cent. of oil.

The fruits are not used medicinally except occasionally in the form of an ointment which is applied as an insecticide. They have been employed as a substitute for the bitter principle of hops

in the manufacture of beer. Picrotoxin is employed for checking night sweats of phthisis and as an antidote in morphine and chloral poisoning.

The following are its vernacular equivalents:—Hind—Kakmari, Bomb—Kakaphala, Tam—Kakkay, Kollivirai.

The fruits crushed and macerated and made into a paste, act as a powerful germicide and is applied to parasitic skin diseases

Vitex Peduncularis.

The following are the vernacular equivalents of *Vitex Peduncularis*.

Boruna, goda—Beng; Osai—Assa; Bhadu—Santal; Kyetyo—Burm.

A tree met with in Behar, at Parishnath, Pegu, etc. It is also found in Southern Mahratta country.

In Chhota Nagpur the bark is used for making an external application for pains in the chest.

Analysis of Vegetable Oils.

703 I. K. R., Agra.—Wants to know the analysis of vegetable oils.

GROUNDNUT KERNEL.

Fat 43 to 50 per cent.
Albumen 27 to 28 per cent.
Starch and Cellulose 13 per cent.
Sugar and gum 7 per cent.

ANALYSIS OF SESAME.

Water 4.5 per cent.
Mineral matter 6 to 8 per cent.
Albuminoid 22 per cent.
Oil 56.83 per cent.

COCONUT OIL.

According to a Chemical Analysis the total fatty acids of coconut oil consist of:—

Caproic acid	2.
Caprylic	9.
Capric	10.
Lauric	45.
Myristic	20.
Palmitic	7.
Stearic	5.
Oleic	102.

COCONUT OIL.

Unsaponifiable matter—0.15 to 0.3 per cent. Free fatty acids oleic—3 to 7 per cent.

Manufacturing Catgut.

2076 B. V., Cocanada.—Enquires how to manufacture catgut.

The coarser kinds of catgut are twisted by a very simple apparatus similar to that known as a "whirl," used by rope-makers. They are used as a substitute for leather belting on light machinery such as sewing machines. The purer or finer qualities are used as strings for large musical instruments such as the double base fiddle. The finest qualities of strings as used for the smaller musical instruments require extreme care in their preparation.

The first stage in catgut making consists in freeing the intestines from any adherent fatty matters, after which a number of ends are tied together and the major portion is left to lie in water for about two days, the water being meanwhile frequently changed, the object in view being to soften any mucous

membranes so that they may be more readily removed by scraping. The gut is then sorted out and graded for different purposes that which is intended for strings being put in a solution, consisting of 4 oz. of potash and 4 oz. of carbonate of potash to each 4gal. of water. The gut is then passed on to workers, who draw the pieces one by one, whilst still wet, through a perforated brass thimble, with the object of rendering the gut smooth and of uniform size. A number of pieces may then be spun together and left as they are if desired semi-transparent, or dyed in various colours. The gut, whilst still in a moist condition, takes dyes readily.

Manufacture of Plaster of Paris.

149 S. K. H., Missouri.—Asks how plaster of Paris is obtained by burning gypsum.

On a small scale plaster of Paris is prepared by gradually heating the natural powdered gypsum in iron pans with continuous stirring until water is no longer condensed on the cover of the pan.

On a large scale it is heated in large ovens similar to those used for baking bread, out of contact with the products of combustion. The furnace is heated with wood and cool up to a suitable temperature and the fuel removed before the gypsum is introduced.

The burning of crude gypsum takes from twelve to twenty-four hours; 60 to 70 kilos of coke are used for heating per cubic metre of plaster of Paris produced.

A method of manufacture which is often adopted is the following. The

natural gypsum, in large lumps as it is quarried, is first crushed and then ground in the usual form of mill with horizontal stones.

After grinding in this way the crude gypsum is heated in open iron pans furnished with stirrers and holding about 60 to 70 kilos. These pans are arranged over a hearth heated with coal and lined with refractory bricks in order to avoid direct contact with the flame or with the hot gases; in this way heat is transmitted through the refractory lining and the temperature of the mass of gypsum does not exceed 120 deg. to 130 deg; 18 to 20 kilos of coal are used per 100 kilos of gypsum.

During heating the stirrer is always kept in slow motion and the end of the process is recognised by the fact that the mass ceases to "boil," because no more steam is evolved in the form of vapour jets which rise through the powdered gypsum.

The product scagliola is thus obtained; in order to obtain ordinary plaster of Paris the gypsum is heated in small pieces in furnaces without stirrers, but a poorer quality is thus obtained; this process takes a few hours.

Lustre Polish.

348 S. D. H., Gujranwala.—Wants a recipe for lustre polish.

Lustre polish or paste is used for plate glass, picture frames, and metal. Five parts of very finely washed and pulverised chalk; 5 parts of Vienna lime; 5 parts of bolus, powdered; 5 parts of wood ashes powdered; 5 parts of English red, pow-

dered; 5 parts of soap powder. Work all together in a kneading machine, to make a smooth, even paste, adding spirit. The consistency of the paste can be varied by varying the amount of spirit from a solid to a soft mass.

Extract of Herbs.

392 T. N., Western Duars.—Writes, "please direct me in the extraction of herbs".

The preparation of medicinal extracts may be classified under two divisions: viz., (1) the production of a solution of the soluble portion of the substances operated on and (2) the reduction of this solution by evaporation to the consistence of an extract.

(1) Preparation of solutions. The proper quantity of the ingredients being taken, the whole is well bruised or reduced to powder or otherwise divided by slicing with a knife, that every portion may be fully exposed, to the solvent action of the fluid.

In the preparation of aqueous extracts the ingredients are treated with water until all the soluble matter that it is desirable to obtain is dissolved out. There are several methods of effecting this object, depending upon the nature of the substances acted. Generally boiling water is poured on the substance and is digested on it for some time. The solution is finally filtered.

(2) Reduction of solutions. The reduction of the solution to the proper consistence is effected by evaporation. The operation should be conducted as quickly as possible, in a broad, shallow pan placed in a water-bath, until a proper consis-

tence is acquired for forming pills, stirring with a spatula.

Preparing Pearlash.

250 M. D. B., Mhow.—Asks how pearlash is prepared.

This is prepared by calcining crude potashes on a reverberatory hearth, dissolving the calcined mass in water, and, after repose, decanting the clear solution, and evaporating it to dryness in flat iron pans, the product being constantly stirred towards the end to reduce it to a semigranular state. Although purer, its richness in absolute alkali is less than that of the potashes from which it is prepared.

Bath Soaps.

The same gentleman wants recipes for bath soaps like camphor soap and rose soap.

(1)

CAMPBOR SOAP.

	By parts.
Good Tallow soap	150
Rosemary oil	4
Oil of lavender	1
Camphor	6

The camphor is first rubbed fine and mixed with the perfume.

(2)

ROSE SOAP.

	By parts.
Coconut oil	2000
Caustic Soda lye (40 deg. Be)	1000
Oil of geranium	8
Oil of bergamot	8
Rose Oil	1½
Tincture of musk	1½

Rose Propagation by Cutting.

422, V. M. A. M. G., Velanpalayam.—Requires some hints on the propagation of roses by cuttings.

In September or October, when the young wood is well ripened, take off the

slips, and cut them in the usual way to two or three eyes, according to the distance which they are apart, taking care at the same time to retain a portion of the principal leaf-stalk and some of the stalks of the first leaflets. Put them singly in small cutting pots, or in pans, using plenty of-drainers, and filling up with peat or with compost of sand and leaf mould. Plant with a small dibber, pressing the soil firmly to the base of the cuttings, then water, and plunge the pots to half their depth, in a bed sloping about 6 inches, and well exposed to the sun; and cover with a hand glass. In a fortnight or three weeks the cuttings will have callused and emitted some rootlets. They will not succeed well in the shade so late in the season. An old melon bed is a good situation for them, as it does not afford too much moisture. Shading should be attended to for some time, if the autumn sun has much power. At the end of a fortnight air must be given by raising the edge of the handglass on a small pot. When heavy dews fall keep the glass perfectly close, and put dry leaves round as high as the top of the handglass. In April or May the pots will be found well filled with roots, even in varieties most difficult to strike. The young plants should now be gradually exposed more and more to air and sun till the handglass is wholly removed. The points of the young shoots should be removed, and all lower buds, if any show themselves, pinched off, so that the plant may gain strength and throw out branches. In June all those which have been struck in the same pans should be separated into a single pot, and plunged again. They may require shading for a short time till they begin to grow, but they will soon be well established and fit to plant out.

'BRIEF QUERIES' AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

246 A. J., Bhera—Your previous letter is not traceable.

247 B. R. C., Chakrab—An article on block-making appeared in February 1923 issue. There is no institution known to us, where block-making is taught. Try to be an apprentice in a block-making concern. For this purpose you may communicate with Calcutta Fine Art Printing Syndicate, 147, Baranofsi Ghose Street, Calcutta.

249 V. G., Bombay—In stove repairing only book knowledge will be of little avail unless supplemented by practical training. Therefore, it will be advisable for you to engage a mistry in the beginning.

250 M. D. B., Alhwa—Yes, pearlsh is manufactured in India. Formula of pearlsh manufacture this appears in issue Bihar and Orissa, Central Provinces and Berar, Mysore State and Central India are mineral as well as forest products. Books on soap by Hurst and Watt are most reliable books. Formulas of soaps appeared almost in every issue of the last volume of **Industry**.

251 C. J. A., Rawat—Now "vegetable ghee" is in strong demand in India. Hence manufacture of vegetable ghee has a bright prospect. Vegetables rich in fat, such as mowha, etc., are used in the manufacture of vegetable ghee. For particulars of the oil extracting plant, write direct to the party who will supply you with estimates and other necessary information. "Cocogem" is prepared from coconut fat.

252 B. C. R., Ajmer—Process of manufacturers good white soap appeared in January 1926 issue. Process of preparing 'katechu' appeared in December-1925 issue. Watery sulphurous acid is an excellent agent for destroying bed bugs, and their eggs, as well as other noxious insects.

259 B. S. J., Gohana—Process of preparing caustic soda appeared in July 1922 issue. A good recipe of laundry soap appeared in January 1926 issue of **Industry**. Coconut and other oils may be bought of Anath Nath Dey, 3, Mondaputty, Bara Bazar, Calcutta. Tallow may be supplied by Calcutta Tallow Mart, 19, Tinetta Bazar, Calcutta.

260 S. A. J., Bangalore—Yes, you may use aniline dyes. Non-fluidity of ink is due to sediment present in the ink. You may add gum arabic and hydrochloric acid.

262 R. L., Nasirabad—Formula of 'Klenzol' is not known. Process of destroying bugs appears elsewhere in these columns.

263 T. K. S. A., Kumbakonam—The following firms of Delhi deal in diamond and other precious stones: Pratap Singh Chhotelal, Chhota Dariba, Indian Jewellery Trading Co., Chandni Chowk, Hamilton & Co., Ltd., Kashmir Gate and Ramnath & Co., Chandni Chowk.

264 P. Delany, Port Blair, Andaman—Refer your query to Alfred Herbert (India) Ltd., 13, British Indian Street; Burn & Co., Hongkong House, Council House Street and T. E. Thomson & Co., 9, Esplanade East; all of Calcutta.

265 R. S. B., Cochin—It will be advisable for you to study the subject thoroughly before taking up manufacture. For this purpose you may go through Modern Soaps, Candles and Glycerin by Lechert Lloyd Lamborn to be had of Thacker Spink & Co., P.O. Box 54, Calcutta. Or you may engage a practical expert in the beginning.

267 R. P. S., Patna City—For starting business with a small capital go through the New Idea Columns of **Industry**.

268 R. C. L., Lahore—For industrial books enquire of The Book Co., 4/4A, College Square, Calcutta.

269 T. R. Danoh City—"Charak Samhita" may be supplied by N. N. Sen & Co Ltd, 19 Lower Chitpore Road, Calcutta

270 M. K. Muttra—Process of deodorising petroleum involve higher technicalities requiring up-to-date and higher knowledge of applied chemistry

271 R. I. S. Gaya—Recipes of biscuits appeared in February, 1925 issue of **Industry**. Copper may be bought of Balmer Lawrie & Co, 103, Chive Street and K. D. Chatterjee & Co, 15, Raja Woodmunt Street, both of Calcutta

272 J. N. Cuttack—Four books on pyrotechnics enquire of Thacker Spink & Co, 3, Esplanade East and The Book 44A, College Square, both of Calcutta

273 K. B. V. Narsimhapur Various kinds of lamps may be bought of Fani Bhushan Kundu, 85, Harrison Road; Haridhan Daw, 72/73, Old China Bazar Street and Surendra Nath Paul, 180, Old China Bazar Street, all of Calcutta Combs are manufactured by Hackle Comb & Reed Factory, Samnagar, 24 Parganas and Mc Gregor & Balfour Reed & Comb Factory, Entally, Calcutta

274 R. S. Rutlam—Process of preparing negative plates will appear in an early issue

275 A. T. C. C., Rammal. For translation of the 'Puranas' enquire of Chackraverty Chatterjee & Co, Ltd, 15, College Square, Calcutta

276 M. C. D., Calcutta—Encyclopes of various sorts may be bought of Nilmony Halder & Sons, 106, Radha Bazar Street, Calcutta Papers are imported by Ghose Bros, 63/1, Radha Bazar Street, Calcutta

278 I. G. T. C., Cocanada—Hosiery goods may be supplied by E. B. Bros & Co, 11, Dharamtala Street, Calcutta, Calcutta Knitting Woollen Mills, 281/2, Bow Bazar Street, Calcutta, Aryan Hosiery Factory, Bangalore; Andhra Hosiery Mills, Bezawada and Commonwealth Hosiery Factory, Mangalore.

279 P. C. S., Jhang—Reply to your queries appeared under No. 61 in the last issue.

281 M. T., Dacca.—To communicate with any querist write him with number and initials

under care of **Industry** when your letters will be duly redirected.

282 R. K. M., Delhi.—For industrial machineries write to Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta For industrial books enquire of The Book Co, 4/4A, College Square, Calcutta

283 P. P. I. S., Sulkur—For securing agencies of articles required advertise in the pages of newspapers and periodicals.

284 D. P. S., Patna City—Engage some washermen who will wash and dye your cloths. If you conduct dyeing and cleaning business in this way only a few hundred rupees will be required only for buying some furniture and other expenses. Most of the dyeing and cleaning concerns of Calcutta are managed in this way

285 D. C. Hyderabad—In almost all medical schools and colleges there is an arrangement for eye examination. There is no journal known to us that deals with eye diseases exclusively. There are, however, many medical journals in India, now

286 K. M. V. P., Nagerecoil—Your query is outside the scope of **Industry**.

289 S. N., Hyderabad—For gold thread manufacturing machines enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta Gold threads may be supplied by Hiralal Chhaganlal Chhunal Choksy, P.O. Box 38, P. N. Kmarwala & Co, Saiyadpura Vaosheri and Tribhuvandas Vullabhdas Jariwalla, Rampura; all of Surat.

290 G. S., Sagri—Telegraphic instruments may be supplied by Chicago Telephone Supply Co, Hornby Road, Post-Box 459, Bombay.

291 A. K. M., Howrah.—To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected.

295 R. S. S., Orai.—For German sewing machines enquire of Indo-Swiss Trading Co, 27 Pollock Street, Calcutta and Indo-German Trading Co, 11 Dalhousie Sq., Calcutta

296 V. J. K. T., Goa—There is still some prospect of merchants in Mesopotamia

297 P. C. W., Muds—Magical appliance, may be supplied by Hornley Bros. Ltd, Magical Palace, 35 New Oxford Street, London W C and Will Goldston Ltd, 14 Green Street, Leicester Square, London W C

299 R S M B., Kashipur—For taking agencies of insurance firms you may write to the following parties: Kerr Taruck & Co., 11 Clive Street; D M Das & Sons, Lall Bazar St, and Oriental Govt. Security Life Assurance Co. Ltd, 2 & 3 Clive Row; all of Calcutta. For securing agencies of typewriters communicate with Aryan Typewriting Co., Girgaum, Tram Terminus, Bombay; Modern Typewriter Co., 12 Crooked Lane, Calcutta and Remington Typewriter Co.; Ltd, 3-1, Council House Street, Calcutta. Other addresses appeared in the previous issue. Communicate with them direct for taking agencies.

301 M. M., Quetta. Oils of all sorts may be bought of Anath Nath De, 3 Mondaputti, Bara Bazar, Calcutta. Amila may be supplied by Bansil Dhar Dutt & Sons, 126 Khenetaputti, Bara Bazar, Calcutta. A good recipe of white soap appeared in January 1926 issue. Petrolums may be bought of Sickis & Co., 551, Canning Street, Calcutta.

303 S. R., Balawath—Scientific appliances may be supplied by Scientific Supplies Co., 29-30 College Street Market, Calcutta; and Scientific Instrument Co. Ltd, Johnstonegan, Allahabad. Acids are manufactured by Boreal Chemical & Pharmaceutical Works Ltd, 15 College Square, Calcutta. Spirits are manufactured by D. Waldie & Co., 1, British Indian Street, Calcutta. Chemicals are imported by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

308 C. R., Kahanpur—A good recipe of washing soap appeared in January 1926 issue. Process of manufacturing washing soda will be found in July 1924 issue.

309 I. M. C., Dacca—Tablet making machines may be supplied by Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta.

310 K. T., No Address—For remedying the defects of cigar manufactured by you take expert advice. Process of flavouring tobacco appeared in June 1925 issue. For Tamil books write to local book sellers.

311 D. B. S., Eburn—Motor cars may be bought of Allen Berry & Co., 24 Park Street, Calcutta; G. McKenzie & Co., 17, Park Street, Calcutta; Ford Motors Ltd, 42, Chowmahnee Rd, Calcutta; Behramu M. Antia, 250, Chua Bazar, Girgaum Road, Bombay; Karachi Motor Car Co., McLeod Road Karachi; British Motor Garage Co., Elphinstone Street, Karachi; Graduate Motor Works, Mori Gate, Delhi; Imperial Motor & Cycle Co., Kashmir Gate, Delhi; Lahore Motor & Cycle Agency, The Mall, Lahore; American Motor Corporation, 15

Beadon Road, Lahore and Karachi Motor Car Co., 5/A, Lawrence Road, Rawalpindi. Motor accessories may be supplied by the above firms. Your other queries are outside our scope.

313 U. C. J., Meerut City—Recipe of lime juice glycerine will be found in the last issue. If you mix coconut oil with other oils such as sesame oil, castor oil, etc., it will not solidify. It is not possible to decolorise cotton seed oil, groundnut oil, etc.

315 E. C. J. C., Vizagapatam—Address of International Trade Developer is Grosvenor House, 21, Old Court House Street, Calcutta. Cements are manufactured by Ashby William & Son Ltd River Bank, East Greenwich, London, S. E. 10; The British Portland Cement Manufacturers Ltd, 4 Lloyd's Avenue, London E. C. 3 and Woultham Cement Co. Ltd, 35 Great St. Helen's, London E. C. 3. Addresses of produce brokers appear elsewhere in these columns. Rice may be supplied by Currumbly Lalljee Sajani & Co., 93 Mogul Street, Rangoon and R. D. Tata & Co., of Merchant Street, Rangoon.

318 T. C. Bhusawal—Your query is unintelligible. There are no such things as Lemon and Orange Squashes.

319 S. C. A. J., Bangalore—Crown corks may be supplied by N. W. Mitchell & Sons Ltd, 2 Dod Street, Lime House, London E. 14. For ink pots of required design enquire of Parry & Co., 11, Clive Street, Calcutta. Cardboard boxes may be supplied by H. I. Sett & Sons, 8 Nihoney Mitter Street, Calcutta.

320 Y. B. B. S., Sibapur—Your query being in the nature of an advertisement should not be published in these columns.

321 V. P., Koslanda—Wants to buy wicks for candle. Chemicals may be bought of B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta.

322 P. B. C., Porbandar—For bell of required size try Bells Brass Foundry, 52 Lower Kennington La, London S. E. 11, and Delta Metal Co. Ltd, Greenwich, London E. C. 10. Addresses of insurance companies appear elsewhere in these columns.

323 S. R. C. A., Tirukkolur—An article on bl. k making appeared in February 1923 issue of *Industry*. Yes Tamil equivalent of apriment is 'Aritharam'.

324 P. V. S. R., Udamalpet—Following are some of the woollen mills as required by you: Egerton Woollen Mills Ltd, Cawnpore; Anglo-Dutch Woollen Co. Ltd, 54 Conduit Street, London W. 1; Heather Mills Co., 37 Sackville Street, London W. 1; Wollweberie Spisget & Co., G. m. b. H., Baden-Baden and Adolf Dobel & Co., Brunnenstrasse 181 Berlin, N. 54; the last two of Germany.

325 M. A. R. B., Kymore—Replies to your queries appeared in these columns under No. 227 in the last issue.

326 A. S., Bangalore.—No such book is known to us.

328 M. V. R. S., Bowringpet.—For books on biscuit and bread making enquire of Thacker Spink & Co., Esplanade East, Calcutta.

332 B. C., Bombay.—Hardwares mentioned by you are not manufactured in Calcutta but these are imported from Great Britain, Continent and U. S. A.

334 S. D. W., Mangalore.—Reply to your queries appeared in March issue under No. 3199.

339 A. K. N., Shillong.—For learning paper cutting, you have to approach artisans individually.

340 G. R. V., Shanpur.—For "dhumming" machines try Khadi Pratisthan, 15 College Square, Calcutta. Hand ice making machines may be had of Giacomo Jucker, Apollo Street, Box No. 14, Bombay. Chemicals required in soap making may be bought of Calcutta Chemical Co. Ltd., 35/1, Pandita Road, Ballygunge and B. K. Paul & Co., 1-3, Bonfields Lane; both of Calcutta. Tallow may be supplied by Indian Bristles & Lard Supply Co., 31/1, Tangra Road, Calcutta. Soap moulds may be had of L. B. Varma, Cawnpore.

342 S. D. V., Multan Cantt.—For poultry keeping you may go through Poultry Keeping in India by Isa Tweed to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta. For leather manufacture you may consult Leather Manufacture by Alexander Watt to be had of the above firm. Sugar manufactory machineries may be supplied by Burn & Co., Hongkong House, Council House Street, Calcutta. You may go through The Manufacture of Cane Sugar by Jones and Seard. Sugar is manufactured by Cossipore Sugar Works, Ltd., 5 & 6 Gun Foundry Road, Cossipore, Calcutta, Supaul Sugar Factory, Supaul, Bhagalpur, Poona Sugar Works & Rum Distillery, Wanowrie, Poona; Cawnpore Sugar Work Ltd., 123/1 Halsey Road, Cawnpore, Punjab Sugar Mill Co. Ltd., Lahore and Rewah State Sugar & Oil Factory, Rewah. C. I. Glasswares are manufactured by Calcutta Glass & Silicate Works, Belgachia, Calcutta, Bengal Glass Works Ltd., 39/1, Canning Street, Calcutta, Allahabad Glass Works, Naini, Allahabad and Paisa Fund Glass Works, Talegaon, Dabhade, G. I. P. Ry. You may consult Glass Manufacture by Walter Rosenham. To be enlightened on silk industry consult Silk in India by M. N. Dey. Addresses of silk manufacturers appear elsewhere in these columns.

344 N. C. M., Hughly.—Simple and easily workable recipes appear regularly in the Small Trades and Recipes Columns of **Industry**.

345 P. K., Mylapore.—For improving odour of ghee boil a few lemon leaves in it for 15 minutes.

346 N. K. M., Elempulasserri.—For Cocculus Indicus try S. N. De, Post Box 7851, Calcutta. For imitation whisker try Chatterji & Sons, 35 Akhil Mistry Lane, Calcutta.

353 C. T. G., Trichur.—An article on bleaching silk appeared in May 1924 issue of

Industry. Dyeing recipes will be found in August and September 1925 issues of **Industry**. You may go through Dairy Farming in India by Messrs D. J. Megher & R. E. Vanghan.

354 R. V. S. S., Bijapur.—The process of preparing menthol oil published in February issue is complete, if you find any difficulty we shall be glad to clear those.

356 S. D. S., Arkonam.—You may use rose water, kora water, musk and liquorice powder in betel powder manufactured by you.

357 R. C. P., Sahmpur.—We do not undertake to teach sugar chemistry by correspondence.

358 M. W. S., Masar Road.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

360 K. N. T., Dohad.—For books on lime industry enquire of Chackravarty Chatterjee & Co. Ltd., 15 College Square, Calcutta.

361 A. R. Q., Gujrat.—Your enquiry is outside the scope of **Industry**.

362 C. B. M., Ajmer.—You may start a dyeing factory. Dyeing recipes will be found in August and September 1925 issues of **Industry**. You may apply ordinary printing ink in facsimile printing.

363 M. R. S. N., Madura.—For printed tinwares enquire of Calcutta Tin Printing Works, P. O. Box 6772, Calcutta, and Calcutta Colour Printing & Hollow Ware Ltd., 245, Upper Circular Road, Calcutta.

366 M. B., Nagpur.—Articles on match industry appeared in July 1922 and September 1923 issues of **Industry**. If you go through those articles you will get good ideas of starting a match factory.

367 A. S. B., Kankanady.—Please explain your requirement more clearly.

368 P. S. D., Dhalaputiva.—For dyes used in dyeing cotton enquire of Calcutta Chemical Works, 35/1, Pandita Rd., Ballygunge, Calcutta.

371 K. A. D., Negapatnam.—Wants to be put in touch with saccharin dealers of Lahore and Amritsar. Refer your query to the Consul-General for Germany, 2 Store Road, Ballygunge, Calcutta.

EARN Rs. 100/- MONTHLY

By investing a small capital. Finishing Match Factory with World's Best German match machine by the Badische Maschinen Fabrick (Established 1854, oldest match machine manufacturers in Germany) **Guaranteed German damp-proof formula.** Particulars on request **with one anha stamp:—N. B. Mukerjee, B. Sc., Gold Medalist, Late Consulting Match Expert to the Govt. of U. P., Jenapur P.O. B. N. Ry. (Cuttack).**

WHITE STICKS FOR SALE AT THE CHEAPEST RATE.

372 J. V. B., Bobbili.—You may go through *The Banana*; Its Cultivation, Distribution and Commercial Uses by W. Pawcett.

373 S. J., Dehra Dun.—The plastic cinema film referred to by you is still in its experimental stage. Hence its further particulars are not available.

374 M. C., Najibabad.—For machineries required enquire of H. M. Mehta & Co., 123 Esplanade Road, Fort, Bombay.

375 J. S. S., Kheki Bahawal.—Men's and women's hair may be supplied by Sung Chuan Tien & Co., Tsinan, Shantung, China and China Merchants' Ponyee Association, 8 Rue du Consulate, Shanghai, China.

376 M. Q. R. C., Madhapur.—For betelnuts enquire of Madhab Chaudra Daw, 4 Armenian Street, Calcutta.

377 R. V., Azamgarh.—Indian ottos are made from sandal oil as a basis and of refined petroleum oil as mentioned by you.

378 V. S. R. R., Udam.—Refer to query No. 14 in April 1926 issue.

380 M. C., Peshawar.—Write to the Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta for the machine required.

381 R. S. K., Sreerangam.—Simple heat will melt glass. Process of manufacturing glass will be seen in December 1925 issue of *Industry*. Recipes of menthol cream appeared in August 1921 issue and process of preparing thymol will be found in December 1921 issue of *Industry*.

382 K. S. Jeypore.—Ready made aluminium bronze alloy is not available in the market. Try to manufacture it at home. It is composed of copper 90 per cent and aluminium 10 per cent. It has a golden yellow colour, is very dense and homogeneous. It may be worked hot or cold, though it is difficult to weld.

383 S. N. S., Baramati.—Formula of citric acid from glucose contained in molasses will appear in an early issue.

384 S. A. A., Trichinopoly.—Simple recipes of floral oils will be found in February 1925 issue.

385 R. V. V., Burhanpur.—For speedy sale of your manufactured articles advertise in pages of newspapers and periodicals. Plaster of Paris may be bought of Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta.

386 J. G. T. C., Cocanada.—For walking sticks and whips enquire of S. N. Bhattacharjee, 5 Dharamtala Street and Carr & Mahalanobis, 30, Chowringhee, both of Calcutta.

388 S. C. R., Calcutta.—Recipes of snow cream appeared in July 1924 issue. A formula of toilet soap appeared in April 1925 issue. In the soap use sandal otto the product will be sandal soap. Without being emulsified there is no possibility of dissolving oil in water.

389 D. S. C., Rasra.—Glasswares may be supplied by C. K. Das & Sons, 17 College Street, Calcutta, Ebrahim Mohamed & Co., 391, Canning Street, Calcutta; Budhabhoy Numbhoy, 614 Abdul Rehman Street, Bombay and D. Tucker & Co., Barabhai Mohalla, Abdul Rehman Street, Bombay. Hosiery goods may be supplied by M. H. Dinshaw & Co., Green Street, P. O. Box 148, Bombay; Sen Abdul & Co., G-26, 27-28 Municipal Market, Calcutta and F. B. Bros. & Co., 11, Dharamtala Street, Calcutta. Buttons may be bought of Khan & Khan, 10 Meadows Street, Fort, Bombay; Nitto Trading Co., 111 Radhabazar, Calcutta and S. A. Khahque, 11, Colabota Street, Calcutta. Umbrellas may be bought of Nunda Lal Dutt, 120, Khengraputty and Butto Kristo Paul & Co., 121 Khengraputty; both of Calcutta. Novelties may be bought of Mohomedbhoy Jwabhoi & Co., Nizam Street, Bombay 9; Laurel Novelty Co., 43 Park Street, Calcutta, and The Union Trading Co., 166 Harrison Road Calcutta. Toys may be supplied by Edulp Framji & Co., Nakhoda Street, Jackaria Masjid Road, Bombay and K. B. Nan, 233, Old China Bazar Street, Calcutta; other addresses you require appeared several times in these columns.

390 D. S. B., Katwi.—For pulse splitting machines enquire of T. E. Thomson & Co., 9 Esplanade East, Calcutta.

391 H. L., Begu-arai.—Heiko scents may be bought of Sickri & Co., 554 Canning Street, Calcutta and B. K. Paul & Co., 1-3 Bonfields Lane, Calcutta. Cochin coconut oil may be supplied by Aspinwall & Co., Ltd., T. Stanes & Co., Ltd., and Kirkpatrick & Co.; all of Cochin.

392 T. N. Western Duars.—Process of extracting medicinal herbs appears elsewhere in this issue.

394 N. R. V., Meerut City.—Method of preparing crucibles for melting brass appeared in October 1923 issue. Seeds may be supplied by W. Atlee Burpee & Co., Philadelphia, U. S. A.

396 K. V. S. R., Secunderabad.—Process of removing ink stains from paper appears elsewhere in this issue.

397 A. C., Dacca.—Commission is a charge of so much per cent made by an agent for buying or selling goods for another, or for transacting any other business for his principal. Discount is an allowance made on a bill, or any other debt not yet become due, in considera-

LETT DEY & Co

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Dealers in Original Homeopathic dilutions and Biochemic Triturations

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tion of present payment. It is usual in commercial dealings to allow for discount a sum equal to the interest on the debt from the time of payment to the time when it actually becomes due. Net may mean the amount of any charge or cost after all deductions have been made the actual amount when no deductions of any kind are allowed.

398 A. B., Dacca—Functions of the Associated and Free Press of India are collection and distribution of Indian news.

399 H. P. L., Dacca.—For advertisement drafting write to Mr. B. P. Gouda, Civil Lines, Aligarh.

400 D. S. L. M. C., Dacca.—Process of dyeing mother-of-pearl appeared in August 1925 issue.

401 R. B., Dacca.—An article on trade marks appeared in February 1926 issue of **Commercial India**, the sister journal to **Industry**.

402 R. C. R., Dacca.—You do not require to take special permission for starting a correspondence institute.

403 S. S., Katmandu.—Process of renovating molium appears elsewhere in this issue.

404 J. S. J. N. S., Jharia.—Refer your query to the Superintendent, Central Book Depot, 8, Hastings Street, Calcutta.

405 D. N. D., Jammu.—Caustic soda is manufactured by The Calcutta Chemical Co. Ltd., 35/1, Pandina Road, Ballygunge, Calcutta; The Magadi Soda Co. Ltd., Managing Agents, Andrew Yule & Co., 8, Chye Row, Calcutta and the Eastern Chemical Co., Agents, Shaw Wallace & Co., 2, Ballard Estate, Bombay. Process of manufacturing caustic soda will appear in an early issue. Bleaching powder is largely consumed by cloth mills.

406 K. E. K., Godhria.—Vernacular equivalents of olive are "jalpai," "perinkara," "muralu" and "uttraccham."

408 M. K. Goslyman, P.O. Carnarvon, Western Australia.—The following are some of the silk merchants of Calcutta—Harchand Roy Hookamchand Bodi, 62, Cotton Street; Bharat Weaving Co., 87, Cross Street; Basant Lal Khettry, 115, Harrison Road and Goomal Parsani, 21 Park Street. Wants addresses of Unani Physicians.

409 A. R. K., Montgomery.—You may correspond with piece-goods manufacturers for taking agency. This business if carried on under organised supervision will be profitable no doubt. Your other idea also seems profitable.

410 L. R. J., Rohtak.—Aerated water machines may be had of Aninchand Mehra & Sons, 34, Armenian Street and Little & Co., 3, Grant Lane; both of Calcutta.

411 R. V. L., Loutulim.—For selling socks and stockings advertise in the pages of newspapers and periodicals. Threads of all descriptions may be had of Bilasirani Thacarsidas, 131, Harrison Road, Calcutta; Fulchand Vanmali & Co., 72 Canning Street, Calcutta; R. M.

Jassewala & Co., 3-12, Appollo Street, Bombay and N. Haridas & Co., 30-30, Parsi Bazar St., 104, Bombay. Knitting machine parts may be had of Indo-German Trading Co., 11 Dalhousie Square, Calcutta.

412 M. N. R., Anantapur.—Alkanet roots may be supplied by Jadhunath Gilar, Hukkaputti, Barabazar, Calcutta. No other root is used for colouring oils.

413 B. N., Madras.—Small churn may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

414 S. R., Muzaffarnagar.—For selling shares of joint-stock companies referred to by you write to Calcutta Stock Brokers' Syndicate, 2 & 3, Lall Bazar Street, Calcutta.

415 J. M. C., Dacca.—Tablet making machines may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar St., Calcutta.

418 K. C. D. G., Barisal.—An elaborate article on artificial silk will appear soon.

419 D., Jellore.—You may use the pocket typewriter after proper demonstration. There is no arrangement for appearing in A. M. I. E. E. degree examination in India. No other formula of chromite is known to us. However your enquiry is engaging our attention.

424 R. S. B. S., Bhatinda.—Tube wells may be supplied by City Tubewell Co., Kaveri Ltd., 84, Chye Street, Bengal Tube-Well & Agricultural Works, 75/1, Buriakpur Trunk Road, Cossipur and Texas Tube Well Co., 5, Dalhousie Square, all of Calcutta.

420 U. M. F., Khurda.—A good recipe of rubber stamp ink (red) will be found in July 1923 issue. Pestle and mortar of stone may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Ordinary sieve will do. Paraffin wax and Siam benzoin may be supplied by Bansilhar Buti & Sons, 126, Khengraputti, Barabazar, Calcutta. Other ingredients you require may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. Caustic soda 35 deg. Be denotes the strength of soda lye. Your other enquiry is receiving our attention.

427 M. H., Lucknow.—For the machine required enquire of Taylor & Challen, Birmingham, England.

431 K. V. G., Chittoor.—Cinema films and machines may be supplied by J. F. Madan & Co., Ltd., Tiretta Bazar, Calcutta.

HIDDEN TREASURE

Right-Hand "Dakshinayan" Shankh. A Right-Hand Conch-Shell, 4" long, for Rupees Two Thousand Only. If you want to prosper daily in Wealth and Health obtain this **RARELY** procurable & unvaluable **GENUINE** article, in a month, or until unsold. Send 1/2 Money in Advance. Write with Stamp to:—

T. NATH, SHUKLA,
MIYAGAM-KARJAN, (Baroda State.)
B. B. & C. I. Rly.

432 M. V. N. R., Bezwada.—Cameras and photographic materials are stocked by Calcutta Camera House, Chowringhee, Calcutta.

434 R. Mullah, 1 Hugh Low Street, Ipoh, Perak, F. M. S.—For the machines required enquire of T. E. Thomson & Co., 9, Esplanade East and Alfred Herbert Ltd., 13, British Indian Street, both of Calcutta.

437 V. M., Kottayam.—Refer your query to the Gramophone Co. Ltd., P. O. Box 48, Calcutta.

438 P. K. C., Bombay.—It is not an easy process to prepare ice cream without ice. For industrial books enquire of The Book Co., 44A, College Square, Calcutta. Wants to learn the art of moving picture photography.

439 B. L. D., Sandip.—It is advisable to apply starch and very fine powder of glass for polishing cord. Process of bleaching "Khaddai" appeared in November 1921 issue of **Industry**.

440 R. L. N. S., Bikkavole.—Refer your queries to the Zoological Department of your province.

441 K. G. S., Rajkot.—Flint glass consists of silica 52, potash 22, alumina 1, oxide of lead 32 and oxide of iron 2. You perhaps mean whitening used in making putty and other substances employed in the arts, consists of chalk ground under water and washed to remove sand, etc. The following are some of the jewellers you require: C. Bullean, Rue Chapon 2, Paris, France; F. Despres & Co., Rue Lafayette 7, Paris, France; E. Barthelmy, Avenue Sax 69, Lyons, France; Barral & Co., Rue de la Republique 10, Lyons, France; Andrews California and Alaska Jewellery Mfg. Co., Diamond Palace, 50 Kearny, San Francisco, Seattle, Wash., last two of U. S. A.

442 R. K., Ajal.—You may send money to U. S. A. and Germany by buying bank drafts from a bank in India that has branches in those countries. You may also send money order. There are many negotiable instruments also particulars of which will be found in August, September, October, November and December 1925 issues of **Commercial India** the sister journal to **Industry**. For importing goods from foreign countries make arrangements with some forwarding agents. "Kapok" cotton was quoted at Rs. 48 per md on 21st April. Wants to be put in touch with dealers in secondhand clothes at Bombay.

443 N. I. W., Bombay.—Can supply brass gate hooks with eyes, brass hooks and brass tower bolts.

445 S. K. M., Muzaftarpur.—For the address of the Indian agent of Tuck Raphael & Co., of London, enquire of the firm. Picture post cards may be had of Calcutta Commercial Bureau, Kalighat, Calcutta and S. Kershaw & Co., P. O. Box 796, Bombay.

446 B. T., Agra.—For buying oil engine on instalment system write to Alfred & Herbert Ltd., 13 British Indian Street, Calcutta.

448 K. L. S. C., Kaimganj.—Printing presses may be bought of John Dickinson & Co., Lall Bazar Street, Calcutta and K. Banerjee, 10 Canning Street, Calcutta. Printing types may be supplied by Gillanders Arbuthnot & Co., Gillander House, Chive Street, Calcutta and also by the above firms. For books on printing enquire of Thacker Spink & Co., 3 Esplanade East, Calcutta. Treadle machine in the beginning will serve your purpose.

449 M. D. S., Bundelkhand.—For particulars you may correspond with the Principal of the following schools: The School of Accountancy 10 Essex Street, Strand, London W. C.; The Shaw Institute, 1, Montague Street, London W. C. 1 and Northern Institute of Business, 108 Portland Street, Manchester.

450 K. V., Bapatla.—Apply the ordinary process of deodorising vegetable oils in case of groundnut oil. The process will be found in April 1922 issue. Coconut oil contains olein and a solid fat often used as a candle material. Groundnut oil contains the glycerides of arachidic, linoleic, palmitic, oleic and linolic acids. For the machine required enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Coconut trees thrive in sandy, moist and saline soil. Wants address of Zambak manufacturing firm.

451 S. L. B., Peshawar Cantt.—For small graining machine enquire of T. E. Thomson & Co., 9 Esplanade East, Calcutta. Coloured labels are not available ready made in the market. You may have them printed as per order. For label printing you may enquire of Calcutta Fine Art Cottage, 70 Dharanitala Street, Calcutta.

453 D. A., Natwana.—Lithographic materials are stocked by Nilmoney Haldar & Co. 106 Radha Bazar Street, Calcutta.

454 G. S. S. C., Fimnevelly.—For the herbs required enquire of S. N. De, M. Sc., Po. Box 7851, Calcutta.

455 S. S. T., Saranpur.—Recipes of "tanbul bihar, panbilas" etc., will be found in December 1925 issue of **Industry**. Copper plates may be supplied by Bahner Lawrie & Co., 103 Chive Street, Calcutta.

457 T. C., Trivandrum.—Process of making a hectograph will be found in August 1925 issue.

460 M. G., Masar Road.—For the machine required write to Oriental Machinery Supply Agency Ltd., 20/1, Lallbazar Street, Calcutta, whether they can supply you the machine. He who has not passed the Matriculation, School Final and similar other examinations is not admitted in a medical college.

462(A) S. P. T., Jharia.—You may go through Rubber Hand Stamps and the Manipulation of Rubber by Mr. T. C. Connor Sloane to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta. Rubber stamp making appliances may be supplied by S. C. Dutt & B. K. Dutt, 100 Durgacharan Mitter St., Calcutta.

462(B) K. A. S., Ellore.—It is advisable for you to seek the services of a soap expert. You may also read a manual on soap making. For industrial books enquire of Chackraverty Chatterjee & Co. Ltd., 15 College Square, Calcutta.

465 A. S., Nellore.—Catechu is largely manufactured in Burma, Siam and United Provinces. It is consumed throughout India.

466 S. A. C., Shannuganathanuram.—In importing goods you have to pay customs duty and for doing business, you are to secure trade license. Exchange rates are regularly published in the columns of **Commercial India**. For starting a journal you should take permission from the magistrate. And for concession of postal stamp have your journal registered.

468 S. M. I. F., Hamirpur.—Process of making a duplicator appeared in August 1925 issue. No other better process is known to us now. However we are enquiring in the matter and the result of our enquiry will be duly communicated to you.

469 A. N. D., Shekhupura.—Refer your query to a mechanical engineer.

470 S. D. S., Nellore.—Flour mills may be bought of Burn & Co., Hongkong House, Council House Street, T. E. Thomson & Co., 9 Esplanade East and Marshall Sons & Co., 99 Clive St., all of Calcutta.

471 U. M. F., Puri.—Refer to No. 426 above.

473 P. P. C. B., Salur.—For rice mills enquire of Marshall Sons & Co. Ltd., 99 Clive Street, Calcutta; Macbeth Bros. & Co. Ltd., 1 & 2, Hare Street, Calcutta and Douglas & Grant Ltd., Merchant Street, Rangoon.

474 B. S. Khaur.—You may go through Poultry Keeping in India by Isa Tweed to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta. You may buy Thacker's Indian Directory. Is in need of bamboo sticks of U. P. and Punjab.

475 S. L. G., Rangoon.—For starting mail order business you may go through Money

Making by Mail by K. M. Banerjee to be had of Industry Book Dept., Keshub Bhaban, Shambazar, Calcutta. Crockery may be supplied by Osawa Seizo Shoten, 4 Shichome, Koamicho, Nihonbashiku, Tokyo and Nuzaki Bros. & Co., 2 Chome Aoi-cho, Yokohama; both of Japan.

479 A. K., Kallai.—Shellac may be bought of S. J. Apar, 57 Radha Bazar Street; J. C. Galstaun, 57 Radha Bazar Street and M. C. Gregory, 8 Mission Row; all of Calcutta.

480 A. L. M. K. N., Kumbakonam.—Coir-making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta who will supply you with estimate and other necessary information.

481 D. C. S., Ludhiana.—Tin boxes are manufactured by Ganad Rampratap, 6 Halsei Bagan Road, Calcutta.

482 K. S. V. N., Sivaganga.—Camphor in large quantities may be bought of Banshidhar Dutt & Sons, 126 Khengraputty Bara Bazar, Calcutta.

483 K. L. V., Sitamai.—Wants address of the agent in India of John J. Griffin & Sons Ltd., Kingsway, London W. C.

484 K. S. R., Nellore.—For industrial and mechanical books enquire of The Book Co., 4/4A, College Square and Chackraverty Chatterjee & Co. Ltd., 15 College Square, both of Calcutta.

Watch repairing tools may be had of S. L. Basack, 5 Old Court House Corner, Calcutta. Machine tools may be supplied by Alfred Herbert Ltd., 13 British Indian Street, Calcutta.

485 N. P. P., Alleppey.—A recipe of bar soap similar to sunlight soap appeared in August 1921. Process of manufacturing ordinary bar soap appeared in November 1925 issue.

486 K. K. R. C., Vizagapatam.—Your query is quite unintelligible. What do you mean by "kora"?

488 G. R. V., Shahpur.—For cotton spinning machines, enquire of the Secretary, Khadi Pratishthan, 15 College Square Calcutta. Ice machines may be bought of Alex Brault, 6A, Wellesley Place, Calcutta. Soap mould may be supplied by Calcutta Industries Ltd., 136-37 Manicktala Main Road, Calcutta. Books on soap making may be had of The Book Co., 4/4A, College Square, Calcutta. Oils may be supplied by Anath Nath De, 3 Moidaputty Bara Bazar Calcutta. Tallow may be supplied by Calcutta Tallow Murt, 19 Tiretta Bazar Street, Calcutta. Chemicals may be had of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta and Calcutta Chemical Works, 35/1, Pandita Road, Ballygunge, Calcutta. For good printing write to Calcutta Fine Art Cottages, 76 Dharamtala Street, Calcutta. No such school is known to us. You may work as an apprentice in a mechanical engineering firm.

489 M. R. T., Bhandara.—Yes, you may try the formula that appeared in December 1922 issue.



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SPORTING GOODS
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Shields.**

**Fine Silver Medals in
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Rs. 3/12/- each.

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**CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

491 S. M. U. S., Agra.—For pushing your business advertise widely. From your statement it appears that the present dullness is due to absence of advertisement.

492 A. K. S., Calcutta.—There is arrangement for training of Indian students in various branches of engineering at Harvard University, Cambridge, Massachusetts, U. S. A. and in Edinburgh University in Great Britain. For further particulars enquire of Students' Advisory Committee, 5 College Sq., Calcutta.

493 H. R. S., Khanp.—You may go through Poultry Farming in the East by Mrs. A. K. Fawkes published by Pioneer Press, Allahabad. You may also go through the series of articles on poultry raising that appeared in November 1924, January 1925, and February 1925 issues of **Industry**. Poultry farming seems to be a profitable business now.

496 T. D. R. B., Colombo.—Beeswax may be supplied by Madhab Chandra Daw, 4 Armenian Street, Jadu Nath Ghar, Mukaputti, Bara Bazar, all of Calcutta. Incense sticks etc. may be had of S. A. Azim Alla Buksh, 57 Lower Chitpur Road, Calcutta.

498 M. D. S., Rajkot.—Ink tablets, powders, etc., are manufactured by Chatterjee Ganguli & Co., 26 Strand Road, Calcutta, U. C. Chakraverty & Co., Bagh Bazar, Calcutta, Sulav Ink Factory 13½ Upper Chitpore Road, Calcutta, P. M. Bagechi & Co., Gulu Ostagar Lane, Calcutta and Hansraj Vishram, 13 David Joseph Lane, Calcutta. Other addresses will be found in advertisement pages of **Industry**.

499 R. L. A. P., Lucknow.—Brass sheets and copper sheets may be supplied by Balmer Lawrie & Co., 103 Chit Street, Calcutta and E. A. Curran, 17 Apollo Street, Bombay. Hinges and screws may be supplied by K. D. Chatterjee & Co., 15 Raja Woodmunt Street, Calcutta and Abimash Chandra Dutt & Co., Monohar Dass Chowk, 208 Harrison Road, Calcutta. Sarees, velvet, etc. may be bought of Champalall Jivanmull, 10 Old Chinn Bazar Street, Lakhmichand Hustanul, 5F, Khargaputti Street and Kripito Dass Coondoo & Sons, 30 Radha Bazar Street, all of Calcutta. Sheet metals may be supplied by Brass Goods Mfg. Co., Brooklyn New York, U. S. A.; John Trageser Steam Copper Works, New York, U. S. A.; Delta Metal Co. Ltd., Delta Works East Greenwich, London S. E. 10, Broughton Copper Co. Ltd., 6 Broad Street, Place, London E. C. 2, E. C. Brown & Co., 4 St. Mary Axe, London E. C. 3 and Charles Hatta & Co. Ltd., 5 Pen Court London E. C. 3. Velvets may be supplied by American Velvet Co., New York, U. S. A., Astoria Silk Works, Long Island City, New York, U. S. A.; Jones Middleton and Co. Ltd., 6 Choriton Street, Manchester, England; Lister & Co. Ltd., 88 Curtain Road, London E. C. 2 and Alfred Wack, 126, Southwark Street, London S. E. 1. Woollen goods may be supplied by Wollwebererei Spiegel & Co., G. m. b. H.; Baden Baden, Germany; Adolf Dobel & Co., Brunnenstrasse 181, Berlin

N. 54, Germany; John Atkinson & Sons Ltd., 30 Bread Street, London E. C. 4; Anglo-Dutch Woollen Co. Ltd., 54 Conduit Street, London W. 1; American Woollen Products Co., Inc., New York, U. S. A. and Worcester Woollen Mill Co., Worcester Massachusetts, U. S. A. Other addresses you require appeared several times in these columns.

500 S. M. J., Gaya.—It is very difficult to say which firm in Calcutta will take your ghee. It is advisable for you to advertise in the pages of Calcutta papers. You may however in the mean time correspond with Durga Charan Rakshit & Co., Cotton Street, Calcutta.

501 H. C., Meerut Cantt.—It is very difficult to say which firms of Germany and America issue catalogues to Calcutta merchants. But addresses of firms of those places willing to establish business connection with India will be found in the pages of **Commercial India** the sister journal to **Industry**.

502 J. N., Fikwah.—Embossing machines may be supplied by Pannier Bros Stamp Co., Pittsburg, Pennsylvania, U. S. A.

503 B. B. P., Dohad.—For silver powder enquire of Anantava Ghosh, 100, Clive Street, Calcutta.

504 A. R. C., Cocanada.—Process of discharging colour appeared in August 1925 issue of **Industry**. Chemicals used may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

505 I. F. N. S., Moga.—You may use soap-nut solution for washing felt or Turkish caps. One pound sterling was equal to 20.42½ gold marks on 20th April at London. On the same day 115 francs were equal to one pound sterling and 135.12 Belgian francs were equal to one pound sterling.

506 P. P. C., Rajkot Para.—A good recipe of hazeline snow appeared in July 1924 issue of **Industry**. For printing write direct to the Industry Process and Printing Dept., Keshub Bhawan, Shambhaz, Calcutta.

508 S. C. D., Ahmedabad.—Cardboard is not manufactured in India. Cardboard boxes are manufactured by H. L. Sett & Sons, 6, Nilmoney Mitter Street, Kundu & Das, 20, Gour Laha Street, and Bengal Cardboard Box Manufacturing Co., 64, Mechna Bazar Street, all of Calcutta. Yarns may be bought of C. Framji & Co., 14, Humnum Street, Bombay; P. N.

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357 Pages, Price Rs. 3. Postage Extra.

A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a God-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & CO.,

29/1, Telepara, Sampooker St., Calcutta.

Mchta & Co., 50, Church Gate Street, Bombay; Hajee Janul Noor Mohamed, 9, Amratola Lane, Calcutta and Economic Hosiery Mills Ltd, 50/2, Dharamtala Street, Calcutta Tea may be bought of Mukherjee Bros, 17-19, R G Kar Road and Bhattacharjee & Co Ltd, 64, Cornwallis Street; both of Calcutta Biscuits are manufactured by P Sett & Co, 3, Ram Kanta Sen Lane, Ultadanga and Britannia Biscuit Co, Dum Dum; both of Calcutta Knitting machines may be bought of M Hindayanarayan, 32, LaTouche Road, Lucknow, Economic Hosiery Mills Co Ltd, 50/2, Dharamtala Street, Calcutta and Indo-German Trading Co, 11, Dalhousie Sq, Calcutta

510 T M, Karachi—For premium bonds enquire of Thomas Cook & Son, 9, Old Court House Street and Alex Brauli, 6A, Wellesley Place, both of Calcutta

511 I S, Nantun—Process of preparing cigarettes will appear in an early issue

515 H A S, Madras—For the book required enquire of The Book Co, 44A, College Square, Calcutta Refer your other query to the Director of Agriculture of your province

516 S C S, Nagapatnam—Magnet may be supplied by Scientific Supplies Co, 29-30, College Street Market, Calcutta Grinding machines may be had of T F Thomson & Co, 9 Esplanade East, Calcutta Wants to buy a secondhand gramophone and records

519 A V, Masnupatam—If you go through New Idea Columns of **Industry** regularly you will find many money-making suggestions there

520 P K K, Kottayam—Tapioea may be supplied by Madhab Chandra Daw, 1, Armenian Street, Jadu Nath Ghar, Hukaputty, Barabazar, and Banshidhar Dutt, 126, Khongraputty, Bara Bazar; all of Calcutta

521 K S S, Rannad—Cinema machines may be bought of J F Madan & Co Ltd, Tirutta Bazar, Calcutta For the book required enquire of Chakraverty Chatterjee & Co Ltd, 15, College Square and The Book Co, 44A, College Square; both of Calcutta

523 J N, Abohar—A good recipe of face cream will be found in July 1924 issue of **Industry**.

526 D A S K, Poona City—Process of preparing washing soda appeared in November 1925 issue Stationery goods may be bought of Dass & Co, 60, Sikdar Bagin Street, Venus Stationery Mart, 7, Nritya Gopal Chatterjee's Lane, Cossipore, and L Basack & Co, 5, Old Court House Corner; all of Calcutta Perfumes may be supplied by B K Paul & Co, 1-3, Bonfields Ltd, Calcutta; Sickri & Co, 55/4, Canning Street and S Shaw & Bros P O Box 342, Calcutta Pictures may be bought of Bombay Fine Art Gallery, 69, Esplanade Road, Bombay and Roy Babajee & Co, 182, Lower Chitpore Road Calcutta Coconut oil may be supplied by Pranjee Jayarama Tanna, Malabar Coast, Cochim and Rose & Co, P O Box 30, Cocanada Kerosene oil may be supplied by Atlantic Refin-

ing Co., Philadelphia, Pennsylvania; Bury Oil Co, New York; Sinclair Oil & Refining Corp; New York and Union Petroleum Co., Philadelphia, Pennsylvania; all of U. S. A.

529 R C, Travancore—The following are the full addresses of the firms required by you. Andrew Yule & Co Ltd, 8, Clive Row, Calcutta, Begg Dunkop & Co., 2, Haze Street, Calcutta; Bird & Co Ltd, Chartered Bank Bldg, 4, Clive Street, Calcutta, and Duncan Bros. & Co., 101, Clive Street, Calcutta Your other letter has been replied by post

530 S R, Ayakudy—Articles mentioned by you are mostly of foreign origin, hence their vernacular equivalent is not available

531 A L C, Kola—Nibs are manufactured by Puri Iron Works, Gujrat, Punjab

533 K V, Baroda—You may go through Electric Journal, 2, Norfolk Street, Strand Street, Strand London, W C 2, Electrical Industries and Investments, 13-16 Fisher Street, Kingsway, London W C 2, Electrical Plant published by Piggott Electrical Co Ltd, 24, New Bridge Street, London, E C 4 and Electrically, 36, Moilan Lane, Strand W C 2 Refer your other query to the Director of Industries of Bengal, 40, A, Free School Street, Calcutta

534 K P K, Poona City—Vegetable products are stocked by Ralli Bros, Church Lane, Calcutta Process of deodorising coconut oil will be found in August 1921 issue You may buy Kelly's World Directory published by Kelly's Directories Ltd, 182-184 High Holborn, Viaduct, London, W C 2 Other addresses you require appeared several times in these columns

535 A K B, Santipur—Mohwa oil may be supplied by Anath Nath Dey, 3, Moidaputty, Bara Bazar, Calcutta Palm oil may be had of B K Paul & Co, 1-3, Bonfields Lane, Calcutta For Chinese vegetable tallow try S N. De, M Se, P O Box 7851, Calcutta Oil of pennyroyal may be supplied by P. Mukherjee & Co, 29-31, College Street Market, Calcutta The patent medicine you require may be bought of Martin & Harris, 8, Waterloo Street, Calcutta Chemicals you are in need of may be had of B K Paul & Co, 1-3, Bonfields Lane, and Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square; both of Calcutta For bleached thread try Sukdeo Ram Misra, 212, Cross Street, Calcutta

536 P D, Bankura—For rose otto enquire of Khoda Buksh, 7, Colbotola Street, Calcutta. You may correspond direct with Mr Kaligaiyana whose address is complete.

537 P T, A, Bimlipatam—Sheet metal working machine may be supplied by Taylor & Challen, Birmingham, England Tin sheet may be bought of Balmer Lawrie & Co, 103, Clive Street, Calcutta

539 V D B, Amsitsar—Machineries are manufactured by Burn & Co., Hongkong House, Council House Street and Martin & Co, Clive Street; both of Calcutta.

540 J. N. D., Malda.—Rice mills may be supplied by Marshall Sore & Co., 99, Clive St. and Macbeth Bros., 1 & 2, Hare Street; both of Calcutta. Oil mills may be had of Burn & Co., Hong Kong House, Council House Street, Calcutta. Match machines may be supplied by Bengal Small Industries Co., 91, Durgacharan Mitter Street and Bhawani Engineering & Trading Co., 122/1, Upper Circular Road, both of Calcutta. Those firms will supply you with necessary information.

541 M. R. B., Bhara.—In prewar days, of the total exports of gum from India bulk was taken by Italy but during the war period and afterwards France has been biggest purchaser. Gut and casing are used in sporting goods and musical instruments largely. Wants to be put in touch with suppliers of cardamom large and small; black pepper; Bombay dry ginger, and cloves. Cloves are imported from Pemba and Zanzibar. For other portion of your query refer to No. 86 under Brief Query Columns of April 1926 issue of **Commercial India**.

542 R. D. M. C., Jullundur City.—You may go through the following journals: Brush Making, 21, Bride Lane, London, E. C. 4; Chemistry & Industry, 46-47, Finsbury Square, London, E. C. 2; Design and Industry published by Kingfisher Press Ltd., 27, Southampton St., London, W. C. 2; Handicrafts published by Odhams Press Ltd., 85-94, Long Acre, London, W. C. 2; Journal of Chemical Technology, 32, Shaftesbury Avenue, London, W. 1 and Science Progress published by John Murray, 50/A, Albemarle Street, London, W. 1. Exchange rates appear regularly in daily papers. For the directory enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

543 G. R., Shahbanda.—Methylated spirit is manufactured from wood by the chemical process of distillation. For further particulars go through the article on Chemical Utilization of Wood that appeared in September 1925 issue

Kaminia Oil

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Finest dressing for the Hair Delicately perfumed. Re. 1/- per bot charges extra

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour surrounding a garden of flowers. Bot of ½ ounce Rs. 2/-, 1 ounce Re. 1/4/-, V. P. & Packing extra

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,

P.O. Box 2082, Juma Masjid, Bombay.

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of **Industry**. For manufacturing ice on a small scale you may use a small plant which may be bought of Burn & Co., Hong Kong House, Council House Street, Calcutta. You may use glass cement. Broken pieces of glass and waste paper may be utilized in the manufacture of inferior quality of glass and paper respectively. Use washing soda in cleaning greasy bottles.

544 T. D. B. C., Porbandar.—Picture frames may be bought of Star Art Framing Works, 40, Meadows Street, Bombay and Fotie Lal Seal & Sons, 10, Swallow Lane, Calcutta. For enamelled jewellery enquire of Mangal Deb Dhanpat Rai & Co., Multan City, N. Gupta & Sons, 5, Gultas Lane, and Paul & Co., 72, Harrison Road, all of Calcutta. To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected. Your other queries being in the nature of an advertisement should not be published in these columns.

545 B. B. D., Bombay.—Write to the querist with number and initials under care of **Industry**, when your letter will be duly redirected.

547 I. M. J. N., Uppattur.—According to an expert opinion water sulphurous acid is an excellent agent for destroying bedbugs and their eggs, as well as other noxious insects. It is sufficient to sprinkle a few drops of the acid upon the places or into the joints and holes infested by the insects, and to repeat this several times. All the ingredients required by you will not be available in one firm. Chemicals and perfumes may be bought of B. K. Paul & Co., 1-3, Bonfields Lane and P. Mukherjee & Co., 29-30, College Street Market; both of Calcutta. Indigenuous herbs may be supplied by Jadu Nath Ghar, Hukaputty, Bara Bazar and Madhab Chandra Daw, 4, Armenian Street; both of Calcutta.

548 R. P. S., Bareilly.—Wants to know the addresses of the sole agents of The Hazlewood Motor Cycles; Wall Auto-Wheels and The Sturmy Archer three speed gear for motor cycles. Chains used in motor may be supplied by motor goods dealers such as French Motor Car Co. Ltd., 234-3, Lower Circular Road; W. Leslie & Co., 19, Chowringhee Road; Stuart & Co. Ltd., 3, Mangoe Lane; G. McKenzie & Co. Ltd., 18, Park Street, Ford Motors Ltd., 110/1, Russa Road, North, A. Milton & Co. Ltd., 156, Dharamtala Street, Allenberry & Co. Ltd., 24, Park Street and Breakwell & Co., 44, Free School Street, all of Calcutta.

551 J. S. A., Bombay.—An article on rose water manufacture appeared in April 1925 issue of **Industry**.

552 J. M. B., Calcutta.—Recipes of shellac appeared in January 1926 issue of **Industry**.

You may also go through Lac—Production, Manufacture and Trade by Mr. J. E. O'Connor to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta

553 K. C. P., Dogachi—An article on 'Sathi' manufacture appeared in December 1921 issue. For the machine required enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta

558 G. S. A., Bombay—Wants addresses of photographers and block makers of China, Mesopotamia, Straits Settlements, Turkey and Persia

560 D. R., Vizianagram—Fancy celluloid articles may be supplied by B. Dzialoszynski, Leipzig 14 and Feodor Rothe, Chemnitz 24, both of Germany. Formula of tea and coffee tablets will appear in an early issue

562 B. N. C., Bombay—For industrial books enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta

564 M. H. N., Lucknow—There is no great difference between kaolin and china clay

565 M. R. B., Bhera—Recipe of sandal oil will be found in March 1926 issue. Picture postcards may be had of Calcutta Commercial Bureau, Kalighat, Calcutta. Heiko brand scents are manufactured by Heme & Co., A-G, Leipzig, U. Groba (Elbe) Germany. White oil may be bought of Anath Nath De, 3, Mordaputti, Bara Bazar, Calcutta. Wants to buy yeast

566 B. P. S., Gorakhpur—You should use cream of tartar. Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta

567 B. S. A., Lucknow—Wants to be introduced to wholesale suppliers of scout requisites

568 N. S. R., Kottapet—Turmeric may be supplied by Jogendra Nath Dass, 25, Pollock Street, Calcutta. Ayurvedic drugs may be supplied by Dacca Sakti Oushadhalaya, 521, Beadon Street, Calcutta

569 H. C., Budaun—For exporting vinegar write to Childs & Joseph; Joseph Jacob and C. G. Dalabhoj & Co., all of Aden

571 U. P. R., Rawalpindi—It is very difficult on our part to give all vernacular equivalents of articles mentioned by you. Hence in future please mention your own vernacular. Cloves are known as "lawanga, layinga, labanga, launga, langa, raung," etc. Hindi and Persian equivalent of Myrrh is "bol." Hindi equivalent of sesame oil is "til-ka-tel." Other ingredients being of foreign origin their vernacular equivalents are not available.

572 K. L. V., Sitamau—For list of books prescribed in B. Ag. examination write to the Principal, Pusa Agricultural College, Pusa, U. P.

573 A. M., Deoghar—Wants to be put in touch with cane suppliers of Bengal and Bihar & Orissa

575 B. V. A., Trichur—Further technical details relating the ice machine and candle machine are not available. It would be advisable for you to commission any engineering firm to build them for you from the description furnished. You may also secure the services of suitable experts for the purpose.

576 A. M. V., Betul—For sewing cases enquire of The Union Trading Co., 166, Harrison Road, Calcutta

577 D. M. R., Kathiawar—For improving the dyes manufactured by you seek service of a paint expert. For disposing of these you may send sample to paint merchants. Those dyes may be used as oil colour but not water colour

580 A. D. R., Tanuku—Cycles may be supplied by Lamington Cycle & Motor Co., Cowash Patel Street, Wellington Cycle & Motor Co., Shiloh Bank Bldg, 52, Tamarind Lane and Cycle Exchange & General Store, 41, Meadows Street; all of Bombay. Sword sticks may be supplied by Abdulally Noorbhoy, Abdul Rehman Street, Essoofally Mahomedally & Co., 78, Bhusari Mohalla, Crawford Market and Gulam Husein Alibhoy & Sons, 252-254, Abdul Rehman Street, all of Bombay

581 M. S. S., Colombo—There is no such medical college known to us

582 N. B., Lahore—Chemicals are manufactured by George Kobler, Leipzig, Alexander Strasse 43, Germany, Leonhardt & Martini, Chemische Fabrik A-G, Hammer Humbelstrasse 18, Germany, Comity Chemical Co. Ltd., 19, Hungerford Street, Commercial Road East, London E. 1, Crown Chemical Works Ltd., Marshgate Lane, Stratford London E. 15; Henry Bower Chemical Mfg. Co., Philadelphia, Pennsylvania, U. S. A., Mall Inckrodt Chemical Works, St. Louis, Mo., U. S. A. and Producers Chemical Corp., New York, U. S. A.

583 J. N. S., Muttra—Sulpho-hydrate of sodium may be supplied by B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For Chinese vegetable tallow enquire of S. N. De, M. Sc., P. O. Box 7851, Calcutta. Culture pearl may be supplied by The Benten, 11-12, Bentendore, Yokohama, Japan. A formula of washing soap appeared in January 1926 issue

NEW IDEA PRIZE AWARD.

FOR VOL. XVI (1925-26.)

There is a paucity of New Ideas and the competition has lost much of its novelty apparently owing to the lack of enthusiasm on the part of the readers. It would not have been possible to carry on this prominent feature of **Industry** but for the keen interest evinced by Mr. E. Lakkaraju, Chemo House, Kharagpur, whose contributions are however, more in the nature of articles. One prize of the value of Rs. 5 (five only) is therefore awarded to him.

' Notices and Reviews.

Ink Powders.

Messrs. K Bros. & Sons, Hobart Road, Roorkee, U P, are manufacturing nice ink powder.

Messrs. Thakur Dass & Co., Chhindwara, C. P., have sent us ink powders.

Hair Oil.

"Basanta Bilas" is the name of a nicely scented hair oil prepared by Nabasakti Pharmacy, 62, Shoya Bazar Street, Calcutta

Rubber Stamp.

It is with great pleasure that we acknowledge receipt of a rubber stamp and universal marking set for our own use from The Official Rubber Stamp Works, Lala Ka Bazar Street, Meerut. We can safely recommend the products of the firm to our readers which we have found extremely serviceable.

Eye Ointment.

Eye ointment, tooth powder and similar toilet articles are prepared by Messrs. G. B. Tundani, Lakhan Kothari, Ajmer

Soap.

Soaps of good quality—Both washing and toilet—are made by Mr. R. B. Saroshia, Chanda, C. P.

Snuff.

From the Vasant Trading Co., Sadashiv Peth, Poona City we have received sample of Dr. A. K's medicated snuff for colds, headache, etc.

Journal on Health.

The Nature Healer. Editor Mr. R. C. Chatterjee, B.L., 20/A, Kalyan Chakrabarty Street, Bagh Bazar, Calcutta. Annual subscription Rs. 3 only.

We welcome the appearance of this somewhat unique journal on health the inaugural issue of which is just to hand.

Of late the public have been evincing great interest in Naturopathy, i.e., the cure of diseases, through the agency of Nature. There is an influential school to-day who offer to heal mankind without the help of drugs and medicines. Even in this country there is a widespread belief in the therapeutic efficacy of air, water, sun's rays and the like. Relief is obtained from many ailments by a simple change of habit or alteration in diet. In the pages of the journal under review all these subjects will be discussed. There will be authoritative articles on self-cure; valuable information about the progress of the science in foreign countries, and practical instruction on its correct application. Our readers may find the journal "worth its weight in gold."

Tooth Powder.

One of the Nuri Cures of Messrs. Gazdar Bros., is the Nuri Tooth Powder for dental diseases. It may be had of Messrs. Patel Bros., Chira Bazar, Bombay 2.

A Noble Enterprise.

We learn with great satisfaction that under the auspices of Raipura Co-operative Industrial Union Ltd., P.O. Raipura, Dt. Noakhali, tanning, weaving, smithy, etc., have been started. Besides leather of all sorts, they manufacture shoes, cloths, towels, etc. We wish the enterprise godspeed.

A Hindi Monthly.

"Bhramar" Edited by Mr. Satish Kumar, B.A., published at Shri Radheyshyam Press, Bareilly, U. P.

It is an excellent magazine dealing in art, literature, science, etc., well printed and well illustrated.

An Industrial Magazine.

"Karlokar Khabar" in vernacular. It deals in enterprise, industry, self-help, etc. For particulars write to Mr. K. P. Kankaria, 120/2, Bhawan Peth, Poona City.

Magazine for Co-operation.

The Bihar and Orissa Co-operative Federation Gazette. The Development Officer, Co-operative Societies, Bihar & Orissa, Patna. Annual subscription Rs. 8-8.

Primarily intended for reviewing the activities and aspirations of the co-operative movement both inside and outside the Province, the Journal under notice also furnishes information and instruction about agricultural, industrial, sanitary, veterinary, educational and social improvements in India and foreign countries. That is to say a good deal about a Government publication which ought to be read by those who would achieve progress through co-operation.

Stationery.

Messrs. Radhe & Co., General Merchants, Entally, Calcutta deserve our thanks in respect of an artistic glass ink pot and paper weight which have been extremely serviceable on our writing desk.

A Bengali Novel.

"Duranta Debata" By S. Bipin Behary Bandopadhyaya this book is sure to absorb the interest of the readers alike in heroism and romance. The delineation of both the amateur detective and the robber-saint has been very realistic. The devotion and sacrifice of the heroine are ennobling. The description of the mysterious Chakra Durga is enthralling. A masterly novel written by a master mind.

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387 M. P. Bose, Baksa Duar, Bhutan—Wants to be put in touch with purchasers of Bhutan musk, wild animals, skins and live animals

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421 V. C. Vaidya, Darukhana, Mazgaon, Bombay 10—Wants to establish business connection with exporters of casem in India and importers of the same in foreign countries.

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490 The Students' Co-operative Stores, Agra—Wish to buy 500 bales of raw cotton

494 Mela Ram Dutt, Railway Road, Sialkot City.—Is in need of feathers and bristles

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554 The Home Industrial Company, Indore—Want a capitalist with Rs. 15,000 to start Indian cinema film industry

563 Abdullah Wali Mahomed, P.O. Box 233, Napier Road, Karachi—Desires to know the addresses of country tanned leather merchants of India and specially those of Madras, Jullundur and Mysore

574 Indo French Novelty Stores, Moga, Punjab—Want garments, moon stones, sapphire circones, agate, blood jasper, massagate and cow tail hair.

604 Bhaosar Bhagabhai Dahyabhai Gajivala, Sagrampura, Kala Mehta's Street, Surat—Wants to be put in touch with suppliers of silk yarn.

625 A. P. Kodatsia, B. Sc., Forest Officer, Bansda State, Surat.—Wants to be introduced to purchasers of Urena Lobata fibres and kapok cotton.

651 John Varughese, Bakthi Vilas Road, Trivandrum.—Can supply Malabar products, such as, copra, coir, coconut oil, tapioca, etc

658 Mela Ram Dutt, Railway Road, Sialkot City.—Wants addresses of rug and carpet manufacturers of Ellore and Mirzapore.

667 The Himalayan Herb Store, Najibabad.—Can supply Himalayan herbs used in Ayurvedic and Unani medicines.

674 Dr. D. S. Gour, Sauror, C. P.—Can supply tamarind and seeds of tamarind

677 Oliver Vere & Co., 17, Bailiff Street, Colombo, Ceylon—Want services of an expert in dyeing fibres

713 Karachi Mosaic Marble Works, P.O. Box 210, Bundel Road, Karachi—Want large supply of silica sand.

JUNE ISSUE OF INDUSTRY

(In The Press)

The June issue of **Industry** which will be published on the last day of the month will contain among other things illustrated article on Harmonium Making, Liquid Extract of Flowers, etc besides the usual features Small Trades and Recipes, Formulas, etc., etc. Any friend of our subscriber will get a sample copy on application to the Manager

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Industry is published at the end of every month

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt rate please write to—

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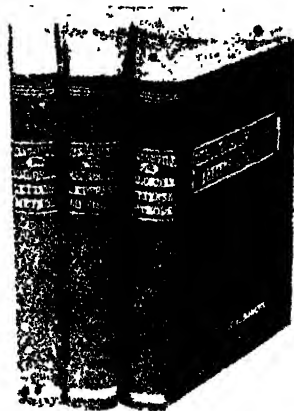
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You can test the value of the Industry-Advt.-Pages by placing the stories of the qualities of your wares even once before its readers' eyes. You reap the benefit always.

The July issue of INDUSTRY will be the Special Cattle Problem Number in which will be made a Systematic Study of Cattle Problem. The economic value of Cattle—how it is deteriorating—how its growth can be effected—better breed—better fodder—better management of cattle—the milk question, etc., etc.

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VOL. XVII.

CALCUTTA, JUNE, 1926.

No. 195.

THE UPWARD URGE.

THE love of adventure is one of the most ineradicable of human instincts, and in many ways the most fruitful in the world of business to-day.

Though it is known in common parlance as "enterprise," we would christen it "the Upward Urge." This restless insatiable energy that drives a man up the ladder of success step by step—thriving on opposition—stimulated by temporary failure—is a modern reminder of the days when the men of the stone age wandered hither and thither in search of a broader, fuller life—from cave to pit-dwelling pit-dwelling to stone hut—stone hut to walled enclosure—walled enclosure to city.

It is the great law of progress in the human race. He who hesitates and falters is lost. It is the bold, impetuous spirit with fervour, stolidity and caution, who comes to the front in business life, just because he has the motive energy, the staying power, and the brakes of reason, in happy combination.

Business is the great adventure of ordinary life. It brings romance, chance, danger, and big prizes within the scope of ordinary mortals.

The business man—if he is a great man—must venture to scale heights his reason tells him are almost inaccessible: and sometimes a superman finds the way to those towering peaks of fame almost by accident, just because he never shirked the adventure and chance of a climb that might end in failure.

The spirit of adventure in business life is like a journey over an unmapped tangle of roads. All we can, and do, know is the general direction to follow, but we may go up five blind alleys or roads that go round in a circle before we strike the one that leads to success.

Success is somewhere behind a score of closed doors, with no response. The successful man tries the whole twenty, and probably finds overwhelming and complete success at about the fag end of his efforts.

The adventure of the constant trier is the adventure of a man born to success, because of his pertinacity quite as much as by his native skill or cleverness.

The adventures of business life call for imagination, quick decision, initiative and powers of leadership in the highest sense. Apathy and lethargy do nothing, and arrive nowhere. Adventure does, at least, move in some direction, and is likely, by the law of averages, to proceed towards the point where success lies waiting.

The only primal necessity in the great adventure of business is this—that whatever advance be made, the lines of retreat must always be kept open.

This is, in fact, the great difference which distinguishes the progressive and enterprising man of affairs from the plunger, speculator and gambler.

This is the secret of success in the career of many a captain of industry and business builder: for every one who has pushed to the front in the battle of commerce knows that he owes his success quite as much to the moral courage he shows in cutting out failures, as to that other kind of courage which looks for, and almost commands, success.

The really successful man is bound to be that odd compound of caution and audacity which is commonly associated with good generalship in the realm of warfare.

The business leader must not only be adventurous, progressive and enterprising, but he must so hearten and enthuse his staff that they, too, will be filled with the spirits of high endeavour and will back him up in all his forward moves. A man imbued with the spirit of adventure has the power to enthuse his rank and file, provided he is willing to tell them all about the struggle, and preferably, give them a share of the success that follows their combined efforts.

Good comradeship, profit sharing, confidence, trustfulness, respect and loyalty between master and man—all these things contribute to make the adventure of business a very much softer proceeding than it could be without them. This leads to the seeming paradox that the adventure of business, properly conducted, with a mixture of audacity, ceases to be an adventure at all, and is in fact, the only real pathway to success.

CATTLE PROBLEM OF INDIA.

One of the most serious economic problems confronting us is the abject condition of the Cattle of India.

Cattle is deteriorating rapidly; death and disease are working their decimation.

Cattle-breeding on modern lines must be conducted at once if we are to save the situation.

Cattle constitutes the main motive power of the Indian Agriculturists.

Cattle must therefore be improved if agriculture is to be improved.

Cattle is an important factor in the question of the milk supply of the cities.

Cattle forms the wealth of the village people.

Can we afford to neglect the problem any more?

We therefore propose to deal with the subject in the July Special Number.

BUILDING A TABLE HARMONIUM.

THE harmonium differs from the organ in having reeds or vibrators, as they are termed, instead of pipes.

The first thing to be done will be to purchase about 16 ft. of $\frac{3}{4}$ in. pine, about a foot wide, and a plank of good sound deodar, 3 ft. long, 7 inches wide, 2 inches thick at one end, and running off to $\frac{1}{2}$ inch thick at the other. One cannot be too particular as to the quality and soundness of wood and it is far better to pay something more for it than to use cheaper but inferior material. This must be thoroughly well seasoned; and in order to insure its being thoroughly dry, keep it in a warm room—but not too near a fire—for some weeks before proceeding to work it.

While the wood is drying the vibrators or reeds may be purchased from the harmonium builders. Buy a good set of 54 notes, CC in the bass to F in the treble, being $4\frac{1}{2}$ octaves. About 15 dozen screws are required for screwing the reed to the sound board. See that the reeds are well riveted, or they will soon get slack, and become the source of much trouble.

Now it is necessary to get the outer case ready first, as the bellows and other parts are fitted to and supported by it. The wood may be any good kind; pine, mahogany, walnut, etc. being equally suitable. First make the ends, which are 2 feet 7 inches high, and about 12 inches wide in the narrowest part, and $\frac{1}{2}$ inch thick. The top portion, to a depth of 7 inches, projects about 2 inches at the front. This wider portion must be

thickened by gluing and screwing a prepared block, 2 inches thick, on to the inside. The bottom part should also be blocked out to the same thickness, and 3 inches in depth. These blocks need not be solid, but may be made of $\frac{3}{4}$ inch stuff, and then veneered over where they will be in sight. Now glue and screw a ledge of wood, $\frac{3}{4}$ inch wide and 3 inches deep, to each end, to support the bellows. These ledges, and likewise the cheeks, should not extend right across the end, but to within half an inch of the back, so as to allow the dust panel, or back, to be fitted in. A glance at Figs. 1 and 7 will explain these operations.

Now prepare a panel of $5\frac{1}{8}$ inch stuff for the front, 3 feet 3 inch long, and 2 feet high, with an opening cut in the bottom part, 1 foot 2 inches long, and 8 inches high, to allow the feet to be placed on the footboards.

This panel is let into the under-side of the cheeks or blocks, about $\frac{1}{4}$ inch. Prepare a board 4 inches wide, 3 ft. 4 inches long, and 1 inch thick, and screw it at the bottom of the lower blocks, so that it may come right to the front, and lay flat on the floor. This is the foundation board, on which the footboards for blowing will be hinged.

Now take two boards, 3 ft. 3 inches long and fix one to the top cheeks at the back, and one at the bottom.

Then proceed to fit up the interior of the case. First prepare two boards 3 feet 2 inches long, 11 inches wide, and at least 3 inch thick, to

carry the feeders and reservoir. Plane them very true and smooth, then cut two holes in each, 6 inches long and 1 inch wide, at a distance of 3 inches from each end. Fig 2. shows the underside of the board to carry the feeders, with two spiral springs, fitted to it, and the holes cut in it for the wind-trunks. The springs are to cause the feeder to open when released from the pressure of the foot, and are termed "gape-springs". They may be made by cutting an ordinary spiral chair spring in half, and placing each half in the position shown.

The feeders should be next taken into consideration. The under or valve boards are each 1 foot 4 inches long, $10\frac{1}{2}$ inches wide, and $\frac{3}{8}$ inch thick. Bore four holes $1\frac{1}{2}$ inch diameter through them, as shown in Fig. 3.

These holes are to be covered by valves, which must be made as follows. Glue two thicknesses of leather together (10 ft. side outwards), leaving one thickness an inch wider than the other; place them between two flat boards, to dry, and then cut them to size, and glue the single thickness down to the valve-boards, thus forming a hinge to the valve. The valves may each be made to cover two holes, so that only two valves will be needed for each feeder. They should be $\frac{3}{8}$ inch larger all round than the holes which they cover.

The valve-boards should now be hinged on to the feeder board, and for this purpose a strip of $3\frac{1}{8}$ inch wood, $1\frac{1}{2}$ inch wide, is to be glued and screwed on to the underside of the feeder-board, and a similar strip on to the inside end of the valve-board. The valve-board may

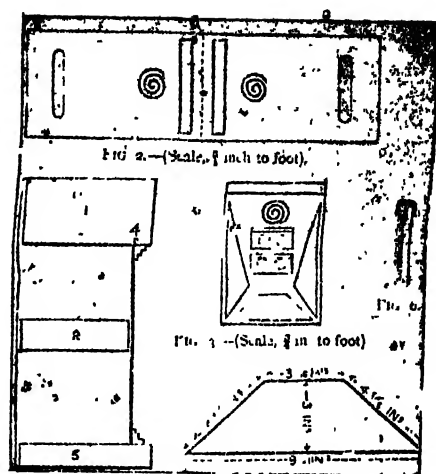


Fig. 1.

Fig. 5.

Fig 1—Elevation of Ends of Case (1 Block or cheek; 2 Ledge, 3 Bottom Block; 4 Groove for Front Panel)

Fig 2—Underside of Boards to Carry Feeders

Fig 3—Valve Boards for Feeders.

Fig 4—Shape of Pieces for Sides of Feeder.

Fig 5—Shape of pieces for Ends of Feeder.

Fig 6—Pair of Ribs (Black line at top shows where linen is glued on)

be hinged either with brass butt-hinges, or a strip of leather, inside and out. Many prefer the latter mode, as there is no liability to squeak.

The folds of the feeder may now be got out of $\frac{1}{4}$ inch board. Altogether eight pieces will be required like Fig. 4 for the sides, and four pieces like Fig. 5 for the ends. The ends of each fold are cut to an angle of about 40 degree. Procure some very soft, supple, white sheep skin, and cut it into strips (lengthways) from the neck, about $1\frac{1}{2}$ inch wide. Cut some strips of linen, about $1\frac{1}{2}$ inch wide; these should be cut across the stuff. Stand each pair of ribs side by side, with their short edges about $3\frac{1}{16}$ inch apart,

which may be secured by placing a strip of stout cardboard between them, and glue a strip of linen over the edges, as shown in Fig. 6. The linen will thus be on the inside when the folds are attached to the feeders. Let this dry, and then glue a strip of leather on the other side of the joint, grain side outwards. Then glue similar strips on the outside of the top and bottom edges, so that half the width of the leather overhang all round. Fasten the spiral springs in their proper position on the valve-board, and then glue the overhanging leather of the folds on to the valve-board and feeder-board. The inside must also have strips of linen on the joints, which may be rubbed down with a strip of wood inserted through the corner holes, the gussets will be put on when all the folds have been attached to the feeder and feeder-board, and well-

rubbed down all the leather, to make it adhere perfectly all over, let it dry thoroughly. Now open the feeder to its full width, and cut a paper pattern of the gussets; then cut them out in leather and after paring all the edges with a sharp knife, glue the gussets on, and rub them down well. A small triangular gusset-piece will be required for each corner where the valve-boards are hinged; and if brass hinges are used, a strip of leather must be glued all along the joint, to make it perfectly air-tight.

When all this is done, clean off the leather with a sponge dipped in hot water, and then cover all the wood-work of the feeders with coloured or ornamental paper, and they will then look very neat.

Now make the two wind-trunks of thin wood; they are $6\frac{1}{2}$ inches high, and slightly larger internally than the wind-holes.

The reservoir should now be made, and as it is merely a rectangular bellows, with each fold $2\frac{1}{2}$ inches wide, detailed directions for constructing it are not necessary. Cut the ends of each fold to an angle of 40 degree the same as the ends of the feeders. The bottom board of the bellows will be $\frac{5}{8}$ or $\frac{3}{4}$ inch thick, and a safety-valve must be made in it in the position shown in Fig. 7. This may be about $2\frac{1}{2}$ inches square, and covered by a valve of thin wood, lined with soft leather (soft side outwards), one end of which overhangs about an inch, and is glued down to form a hinge. The valve is kept closed by a spring fastened through a little staple on the valve. A peg of wood, about $2\frac{1}{2}$ inches high, is

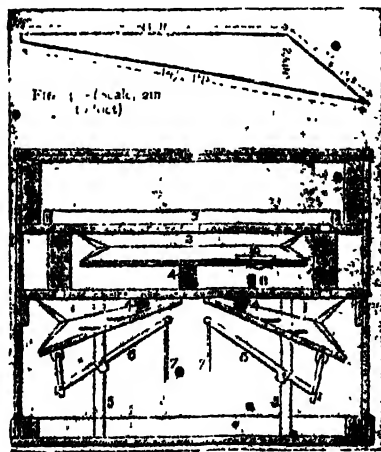


Fig. 7.—(Scale, $\frac{1}{2}$ in to foot.)

Fig. 7.—Arrangement of Interior (1, 1, Feeders; 2 Reservoirs; 3 Wind-Chest; 4, 4 Spiral Springs; 5, 5, Supports for Crank; 6, 6, Cranks; 7, 7, Cords for connecting ends of Crank Levers to footboards; 8, 8 Wind-trunks; 9, 9, Blocks or Cheeks; 10 Safety Valve; 11 Peg to open valve.

fixed in the feeder-board immediately under the valve; so that as the bellows descends, the peg presses the valve open, and allows a little wind to escape, thus preventing undue pressure on the reservoir. A spiral spring is fixed to the centre of the underside of the reservoir, and to the top of the feeder-board. This spring exerts a constant pressure on the reservoir, and gives the force of wind necessary to cause the reeds to sound.

The foot-boards may be made of one inch deal, hinged on the underside of the front edge to the foundation-board already mentioned, and connected from the top by a cord to the lever arm, which is fixed into an axle working on centres in two uprights placed at the front and back of the inside of the case. Another arm extends from the other side of this axle immediately under the centre of the feeder, to which it is connected by a short lug. The general view in Fig. 8. 8 will suffice to explain this, the axle there being shown in section only. The foot-boards should have a ledge of $\frac{1}{4}$ inch, stuff on the front edge, and they may be covered with a piece of carpet to make them look neat.

The reservoir having been completed, should now be fastened with glue to the reservoir-board, which has been previously referred to. This board lays on the top of the two wind-trunks, which should have a strip of leather run all round the top edges to make all air-tight.

The holes in the reservoir-board over the wind-trunks must be covered with leather valves to open upwards, made in

a similar manner to those in the feeders. These valves are to prevent the return of the wind after it has been pumped into the wind-chest. A small hole, 4 inches long and 1 inch wide, is cut in the centre of the reservoir-board to let the wind into the reservoir, and if this is covered with a wood valve lined with leather, so that it may be closed by pulling out a stop knob, the stop termed "Expression" will be obtained. If, however, you do not wish for this stop—which is rather difficult to manage, and causes the breakage of many reeds by over-blowing—you will not require any valve over the hole, but may, if you like, make it rather smaller, and cut two more holes, one on each side of the centre one, and about equidistant from that and the ends of the reservoir, as shown in Fig. 9. To form the wind-chest take some $\frac{1}{2}$ inch pine, $\frac{3}{4}$ inch wide, and glue it all round the top of the reservoir-board fair with edge of it at the sides, but 2 inches in from the ends and plane it level all round, thus forming a shallow box $\frac{3}{4}$ in. deep. Now to see if your bellows answer, lay a strip of leather all round the edge of the wind-chest, and screw a $\frac{1}{2}$ inch board tightly down on it and glue some paper all round the joints to prevent any escape of air, and when dry, fit it into the case, placing a couple of long wedges under the cheeks to hold the reservoir-board firmly, and a screw or two through each end of the bellows board the ledges. Press the foot-boards gently and fill the reservoir, but don't overdo it, and then if your bellows is sound, and the valves act all right, the reservoir will take some minutes to empty itself. This board is

only used to test the bellows and does not form a part of the instrument.

The next step is to make the pan or sound box. Take the pine plank—about 2 ft. 7 inches long, 6 inches wide, $1\frac{1}{4}$ inch thick at the bass end, and tapering off to $\frac{3}{8}$ inch thick at the treble end. Place this very truly on both sides, for it must not be touched with the plane after the subsequent operations.

Take the width of the row of keys—which will be about 2 feet $5\frac{1}{4}$ inches—and mark it on the sound-board, leaving 1 inch at the bass end and $\frac{7}{8}$ inch at the treble end; divide the 2 feet $5\frac{1}{4}$ inches into 54 equal parts, and the lines thus made will be the centres of the mortises; which are set out as follows:— At a distance of $1\frac{1}{2}$ inch from the back edge of the board draw a straight line all along it; at the bass end set off $1\frac{1}{2}$ inch from that line—on the first of the cross marks; at the treble end set off $\frac{1}{2}$ inch on the last cross mark,

and join it by a sloping line to the bottom of the $1\frac{1}{2}$ line, you will thus get the lengths of all the mortises. Then mark the widths of the mortises, which should be $\frac{1}{4}$ inch wide at the bass and diminishing to $\frac{1}{8}$ inch at the treble, cut the mortises right through the sound-board and clear them out nice and smooth, those in the bass may be cut back on the underside as shown by the dotted line in Fig. 8. Cover the top of the board with a piece of stout veneer which should be glued and clamped tightly down, and, when thoroughly dry, the pallet-holes may be cut through it, those at the bass end being 1 inch long and rather more than $\frac{1}{8}$ inch wide and gradually diminishing in size up to the treble. You can mark these out in the same way as the mortises. Having done this, take some $\frac{1}{2}$ inch pine, 2 inches wide, and box round the edges of the sound-board fair on top side, the boxing projecting on the underside only. Now get out a bar of

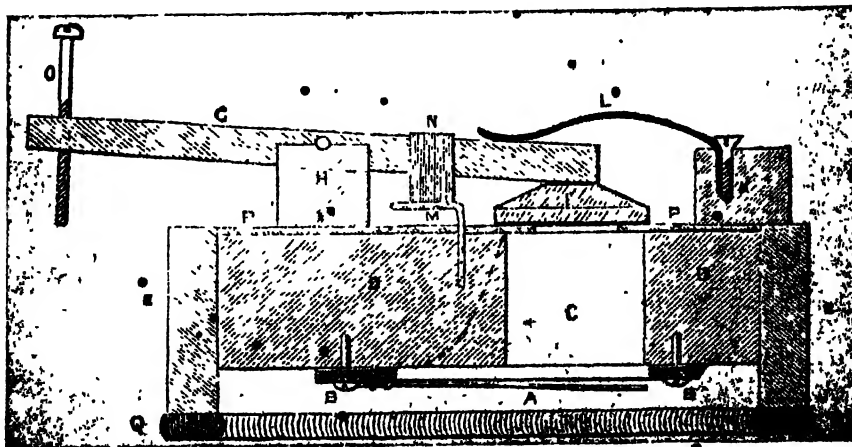


Fig. 8.—Sectional view of bass and of Sound-Board of Pan. Half full size.

Fig. 8. A, vibrator; B, Screws by which Vibrators are fixed; C, Mortise, D, Sound-board; E, Beech Boxing round Sound-board, F, Pallet; G, Pallet Lever; H, Pallet Lever-rail; K, Spring Rail; L, Spring; M, Wire Crook, N, Elastic Band in lieu of steel spring; O, Screw on which Key rests; P, Veneer; Q, Roll of Cloth.

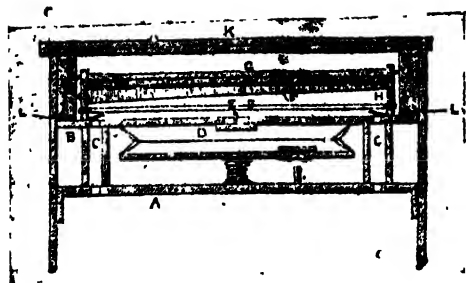


Fig. 9.—Section of.

Upper Portion. Scale, $\frac{1}{2}$ in. to foot.

Fig. 9 A, Bellows Board, B, Reservoir Board, C Wind-trunks, with Valves at top; D, Reservoir, E, Expression Valve, F, Sound-board; G, Pallet Levers and Rails, H Roll of Cloth on Edge of Sound-board, K, Folding Side to case, L, Wedges to secure Reservoir Board.

beech 1 inch square and 2 feet 6 inches long, and glue it down on the top of the sound-board so that the centre of it is 2 $\frac{3}{4}$ inches from the centre of the pallet-holes. Run a deep gauge mark all down the centre of the top of this bar to receive the centre wire on which the pallet levers work. Cut out 54 grooves in the bar in a line with the pallet-holes; this may be done by tying two small tenon saws together. Now make the pallets and levers, as in Fig. 8, the levers being made first, and bored through the centre with a fine bradawl, or drill. The hole in the end to receive the long thin screw can be best made by screwing the lever tightly into a vice, and the screw can also then be inserted without danger of splitting the wood. The pallets themselves are made large enough to cover the holes well, and are tapered off at the top as shown. They are covered with soft leather on the underside, and whiting should be well rubbed into the leather with block of wood. In glueing the pallets on to the levers some place a piece of stout soft leather between the lines and the pallet. String the levers on to the entire wire, put them into the proper grooves and press the centre wire down into the gauge mark then glue a piece of

wood $\frac{1}{4}$ inch thick on each end of the bar, with a hole in it level with the gauge mark to receive the ends of the centre wire, which may be drawn out from either end if required at any future time. Just at the back of the pallets fasten a strip of wood just thick enough to be level with the tops of the levers; this is to fasten the pallet springs in. The springs are made of tolerably stout piano wire, bent into the form shown in the sketch, the front end being turned up to run in a gauge mark on the top of the lever, the back end turned down and fixed into the strip of wood above referred to; a small screw being inserted close behind it, so that the head holds the wire well down, or a small loop may be made in the end of the spring and the screw passes through that.

The vibrators may now be screwed on to the underside of the sound-board in the position shown in Fig. 8, and the sound-board may then be considered complete. It should be hung by a peg through each end, which is made to protect 3 inches for that purpose, the peg running into the cheek blocks, so that the sound-board may be turned down as on a hinge, and lay flat on the wind-chest. Make a little roll of cloth, cover it with soft leather, and fasten it all round the underside of the sound-board, and then fix two iron hooks in the side and two eyes in the wind-chest, so that when the sound-board is turned down on to the wind-chest, and the hooks fastened into the eyes, there can be no escape of wind from the wind-chest except through the vibrators and pallet-holes. As for the key-board, it may be purchased either new or second-hand. When it is placed in position the screws in the ends of the levers should come under the proper keys, so that when the key is pressed down it opens the pallet belonging to that note.

A folding lid should be made to the case, and hinged at the back edge so that it may be turned right back if required to get at the interior of the instrument. Finish off the case in any fanciful style and the harmonium will be completed.

LIQUID EXTRACT OF FLOWERS.

(By A Practical Expert.)

WHAT are known as floral waters are nothing but liquid extracts of flowers. Their mode of preparation is practically similar. The selected flowers, petals, leaves, or any other odoriferous parts are cleaned and freed from stalks etc. They are then digested in water in a closed vessel for some time on a water bath. As a next step the decoction is thickened down by steam heat.

The heat employed at any stage should be moderate as otherwise the product will be spoilt. If a large volume of steam be generated, the lid should be opened to let it out. The extract is finally cooled and carefully bottled.

The vessels used in the above operations should be either of earthenware or of aluminium.

If it be desired to preserve the extract for long add 4 dr. spirit in a pound.

The liquid floral extract obtained as above have multifarious applications. It may be used in masking the strong odour of cigarettes, in scenting cigars, in flavouring indigenous tobacco, in making aromatic surti and zarda, etc. It may also be used in the preparation of syrup and sweetmeats. It will give satisfaction even if it be used as a toilet article, say, as a handkerchief perfume.

ROSE.

Procure 4 lb. petals of freshly blooming red Rose. Put them in 20 lb. distilled water in a vessel. Cover up the mouth and put on fire. When the water

is reduced to only 6 lb., take away and strain through cloth. Throw away the exhausted flowers. Pour 6 lb. fresh water into the extract and dry by steam heat. When only 1 lb. extract is left take away from fire. Allow to cool and store in a jar.

JASMINE.

Take 5 lb. stalked Jasmine flowers and put in a vessel with 20 lb. distilled water. Cover up and boil on fire. When the liquid is reduced to 5 lb. take away from fire. Strain through cloth and throw away the exhausted flowers. Add 5 lb. fresh water and dry in steam heat. Remove when only 1 lb. extract is left, allow to cool and store in a vessel.

BELA.

Take 2 lb. large sized Bela flowers; reject the stalks and steep them in 16 lb. distilled water. Put into a vessel close up its mouth and heat on the water bath for 1 hour. Then remove and set aside the vessel for 12 hours. Strain away through cloth and throw away the exhausted flowers. Put in a fresh batch of 1 lb. flower and heat on fire until only 4 lb. extract is left. Strain and throw away the exhausted flowers. Add 4 lb. fresh water in the extract and dry on steam heat. Remove when only 1 lb. is left and store when cool.

KETAKI.

Select white tender leaves of Ketaki; mince them and make up 4 lb; pollen of ketaki 2 lb; also 16 lb. distilled water. Put all together in a vessel, close the

mouth and set aside for 12 hours. Then put on fire and boil until only 2 lb. are left. Remove and allow to cool. Strain and store in a vessel.

KHUS.

Cleaned and picked Khus Khus 10 lb. distilled water 30 lb. Put the two together in a vessel; close the mouth and heat on fire. Remove when only 7 lb. are left. Strain and throw away the exhausted roots. Add 5 lb. fresh water, heat on steam bath and remove when 1 lb. is left. Store away when cool.

CHAMPAKA.

Champaka flowers 12 lb.; distilled water 20 lb. Put the two together in a closed vessel and boil by heat. Remove when only 5 lb. is left and reject the exhausted flowers. Pour in 7 lb. fresh water and dry on steam bath. When only 1 lb. is left take away and store in a vessel when cool.

RAJANIGANDHA.

Tuberose 8 lb.; distilled water 24 lb. Put the two together in a closed vessel and boil on heat. When the extract is reduced to only 4 lb. then take away, strain and throw away the exhausted flowers. Heat again on fire and take away when only half a pound is left. Store in a vessel when cool.

BAKUL.

Bakul flowers 8 lb., distilled water 12 lb. Put the two together in a closed vessel; and boil on the water bath for an hour. Take away and set aside for 24 hours. Reject the exhausted flowers. Put the extract in a covered vessel and dry by steam heat. Take away when only one pound is left.

CHAMELI.

Chameli flowers free from stalks 4 seers; distilled water 16 seers. Put the two together in a closed vessel, and boil. When the liquid is reduced to 4 seers, remove and strain. Throw away the rejected flowers; put the extract in a closed vessel and dry, by steam heat. Take away when only one pound is left. Store up when cool.

LOTUS.

Procure 10 lb. red petals of Lotus freed from stalk and 16 lb. distilled water. Put the two together in a closed vessel and boil. When only 2 lb. of water is left then take away and strain. Store up when cool.

Lotus water has many important applications.

KAMINI.

Steep 8 lb. Kamini flowers in 24 lb. distilled water; put in a vessel; close the mouth and boil upon fire. When only 4 lb. of water is left take away, strain; and throw out the exhausted flowers. Add 8 pounds water to the extract and dry by steam heat. When only one pound remains, take away and store when cold.

PATCHOULI.

Cleaned and picked Patchouli leaves 6 lb.; distilled water 16 lb. Put the two together in a vessel, cover up and heat on fire. When the liquid is boiled down to only 6 lb. take away and throw out the exhausted leaves. Add 8 lb. fresh water and dry in steam heat. Remove when only 1 lb. is left. Store when cool.

HASU-NO-HENA.

Take 4 lb. Hasu-no-hena flower and distilled water 8 lb. Cover up the mouth and boil. Take away when only 4 lb. are left. Strain and reject the exhausted flowers. Add 4 lb. fresh water, cover up and dry in steam heat. Remove when only half pound is left. Store when cool.

ORANGE.

Put 4 lb. Orange peel and 16 lb. distilled water in a covered vessel and digest on fire. Remove when only 4 lb. are left. Strain and reject the residue. Add 6 lb. fresh water in it and dry by steam heat. The operation is complete when only 1 lb. is left. Store when cool.

The confectioners use lemon peel in perfuming sweets. This liquid extract may be used instead and much labour will be saved.

KAGZI LIME.

Procure 6 lb. leaves of Kagzi lime plant, wash them clean; pour 12 lb. water on them. Put in a closed vessel and boil. Take away when only 6 lb. is left. Strain and throw away the exhausted leaves. Add 5 lb. fresh water and dry by steam heat. Remove when only 1 lb. is left and bottle when cool. Used in culinary.

JANTI.

Take 6 lb. Janti flowers free from stalk and 6 lb. water. Put together in a covered vessel and heat on water bath. Take away after an hour and set aside, as it is for 24 hours. Then throw out the exhausted flowers. Put in the decoction a fresh batch of 3 lb. flowers and again heat on water bath for half an hour. Then strain and reject the marc

residue. Evaporate the extract by steam heat. Take away when only half pound is left and store when cool.

SHEPHALICA.

8 lb. of Shephalica flowers and 8 lb. of distilled water. Put the two together in a closed vessel and apply heat. Take away when only 1 lb. extract is left.

LEMON.

Select 8 lb. Lemon flowers free from stalks and soak them in 32 lb. water. Put the two together in a closed vessel and apply heat. Take away when 6 lb. are left. Throw out the exhausted flowers. Then add 4 lb. fresh water and evaporate by steam heat. Stop when only 2 lb. are left. Bottle when cool.

GLOSSARY.

Bakul—Mimusops elengi; Mulsari; Borsali.

Bela—Arabian Jasmine.

Chameli—Catalonian Jasmine.

Champaka—Michelia champaca; Shampang, Champa.

Golap—Rose.

Jhanti—Barleria; Tadrelu; Koilka.

Kamini—Murraya Exotica; Marchula; Naga glunga.

Keora—Pandanus odoratissimus, Keora, Kenda, Tabun, Tsat-tha-pu.

Khus Khus—Vetiver; Bena, Panni, Valo.

Nebuphul—Lemon flower.

Pachapat—Patchouli, Mali, Pachpanadi.

Rajanigandha—Tuberose.

16 ch.=4 poa=1 sr.=2 lb.

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INDUSTRIAL USES OF ALCOHOL AND ETHER.

AB SOLUTE alcohol is a compound of carbon, hydrogen, and oxygen, in certain definite proportions, the most familiar being ethylic alcohol. Another alcohol of very common occurrence in the arts (as it is much cheaper) is that derived from methyl; and a third, the amylie. It may be remarked in passing that each of the alcohols may be converted into an acid, by the replacement of two atoms of hydrogen by one of oxygen.

The sweet vegetable juices or extracts are liable to undergo fermentation, and it is well known that powerful and exhilarating liquors are derived from them. They all contain alcohol to a greater or less extent, to which ingredient these special characteristics are due. The juice of the grape was perhaps the first source of alcohol, and so it obtained the name of "spirits of wine." It is now, however, very largely manufactured from a great variety of substances, the material from which it is made often imparting to it a peculiar smell or flavour, which has led to a specific name being given to such spirits. Thus, the juice of the sugar-cane produces rum; rice, arrack, etc. Malt made from any kind of corn will yield a spirit, and in continental Europe potatoes, mangold, beet root, carrots, and many other roots of a similar character containing saccharine matter, are mashed up and fermented to make brandy or other spirituous liquors.

Alcohol has such an affinity for water, that it is extremely difficult to keep it absolutely pure, even after it has

once been made so. We will suppose that the distiller has produced the raw spirit, which, when duly doctored may constitute either gin or brandy; it will be found on examination to consist of an indefinite quantity of water. To render it absolute, it is usually distilled over and over again several times, by which means it increases in strength each time; but this process alone will not thoroughly effect the separation of all the water, however often it may be repeated. About 9 per cent. of water is found still to remain mixed with the spirit after carrying fractional distillation as far as possible. The final process is therefore varied, and the last distillations are made in the presence of some carbonate of potassium or chloride or hydrate of calcium, which, having a greater affinity for water than even the alcohol itself, takes up the moisture and only allows the anhydrous spirit to pass over from the retort. If quicklime be used, the retort should be about two-third filled with it, and then sufficient alcohol poured in to cover it over; the lime will soon become slaked by the absorption of the water contained in the alcohol, which can then be separated by distillation. This is repeated several times, until all the water is removed; and the alcohol, being thus rendered absolute, must be carefully preserved from contact with the air or fresh moisture will be absorbed.

As alcohol is considerably lighter than water, the purity of it can be tested with great accuracy by ascertaining its specific gravity. The pure spirit will not exceed 0.795 at the ordinary tem-

perature of the air. Tables have been constructed showing at a glance the relation of the specific gravity to the percentage of alcohol at given temperatures, so that all that need be done, is to ascertain these data as to any specimen in question, and the strength of the spirit will be known at once. Proof spirit, as it is called, is the standard for the assessment of duty; and is of such a strength, that its weight shall be 12 $\frac{1}{13}$ ths of that of water at a temperature of 51 degree F.

It will be readily inferred that tests of purity are only applicable to such spirits as contain no other ingredient, for instance, those which are sweetened will have a greater specific gravity, dependent upon the amount of saccharine matter, held in solution, and the boiling point will also vary according to the nature and proportion of the other ingredients.

Pure alcohol exercises many important functions in Chemistry. By mixing it with snow an intense cold can be produced and it is almost impossible to freeze it, as it may be reduced to 150 degree below zero without congelation, on which account it is used in the manufacture of thermometers which may be required to register very low temperatures. When diluted with water it is a powerful stimulant; but strong alcohol is highly injurious to the animal system, as it withdraws the water necessary to the healthy condition of the tissues, and coagulates the albuminous portions. It is an excellent solvent for all kinds of resins, fats and essential oils, and as such is used in the preparation of the best

varnishes, soaps, and perfumes. Many other substances are also soluble in alcohol, which are not at all affected by water. It is likewise used in the preparation of many compounds which are of much value in medicine, especially of the various anaesthetics, which are now so extensively employed.

"Chloroform," for instance, is yielded by the distillation of alcohol along with some chloride of calcium. The proportions required are 6 parts of the latter to 1 of alcohol containing 84 per cent. of spirit, and 30 parts of water; or it may be made from 8 parts of the chloride of lime, 1 of quicklime, 1 of alcohol, and 40 of water, which will yield a quantity of rectified chloroform equal to one-third of the alcohol consumed. The resulting liquid will be chloroform, the effect of which in producing insensibility to pain on being inhaled is well known. For this purpose it is of the utmost importance that it should be as pure as possible, especially as the ingredients, most likely to find their way into it, are not easily detected except by the injurious effects they produce upon the individual. It is a highly volatile liquid, though at the same time a very heavy one, having a specific gravity of 1.49 at 60 degree. This circumstance affords a ready means of detecting any adulteration, either with alcohol or ether, in both of which it is soluble; in such case the weight of the liquid would be greatly reduced as there is such a wide difference between their specific gravities and that of chloroform. It possesses in a very high degree the power of preserving animal matter from putrefaction.

Chloral, the hydrate of which has recently been introduced as a medicine, and is now very generally administered for the purpose of inducing sleep, is another product, of alcohol and chlorine. The most direct process for its preparation is to pass dry chlorine gas into absolute alcohol. It is of the greatest importance that both of the ingredients shall be free from admixture with water, and as such has a great affinity for it, much care must be taken in order to ensure its absence. The gas is best dried by passing it through some strong sulphuric acid, or over chloride of calcium. At the commencement of the operation the alcohol must be kept cool, by exposing the outside of the glass vessel which contains it to the action of cold water, so as to prevent the contents from taking fire; but as the absorption of the chlorine increases the mixture must be heated nearly to the boiling point. It ultimately becomes thick and syrupy; and after standing a while it solidifies into a soft crystalline mass, which is the hydrate of chloral. This substance is then melted, and agitated with four to six times its bulk of sulphuric acid, when the pure chloral will separate and float on the top. It is finally distilled over slaked lime, for the purpose of removing any hydrochloric acid which may have been formed in the course of the operation. Pure chloral is a thin, pungent, colourless oil, with a specific gravity of 1.5 and boils at 203 degree F.

Alcohol is also the foundation of all the different kinds of ether which are used in pharmacy or otherwise. There are some general characteristics common to all these series of products. They are highly volatile inflammable liquids, of a very light specific gravity, with a

fragrant odour, and having the faculty of producing numbness, even to complete insensibility when inhaled in considerable quantity. They will mix with alcohol in any proportion, but not with water, except to a very slight extent. They are valuable as solvents, most of the articles soluble in alcohol being also capable of being dissolved by ether, and in some cases more readily than in the former.

The ordinary plan of making the oxide of ethyl (known as sulphuric ether) is to distil over a mixture of sulphuric acid and alcohol. If the relative proportions are as two to one, the mixture will boil at about 250 degree F. gradually rising to 280 degree and the vapour when condensed will be found to consist of a mixture of ether and alcohol, the ether greatly predominating as it reaches the higher temperature; as the boiling point rises from that to 420 degree, ether will come over mixed more or less with water; and if the distillation be carried beyond that stage the boiling point will rise still higher, but the contents of the still will be converted into olefiant gas and sulphurous acid.

The object of the manufacturer is, therefore, to keep the boiling point at about 300 degree, which is done by constantly keeping up the supply of alcohol, so that the relative proportions may not materially vary.

Hydrochloric ether, or more exactly chloride of ethyl may be made either by saturating absolute alcohol with hydrochloric acid gas or by distilling alcohol with one of the chlorides, such as common salt. It is used in medicine generally in combination with alcohol.

Nitric ether is also used for a similar purpose to a considerable extent.

DAIRY FARMING.

IF civilized people were ever to lapse into the worship of animals, the cow would certainly be their chief goddess."

The present growth of commercial India needs a careful scrutiny of every business, however small, and the young capitalist who ignores this principle hazards himself to the mortification of failures and losses. Theories are necessary for a successful practice; they are *de facto* the rudder and the compass, the necessary equipment for a man steering through the waves on the sea of life.

The lucrative nature of a business often tempts the layman to invest his capital therein with hopes of high profit. But this very flattering hope brings him ruin instead of 'joy' and he learns though only when it is too late, what comes of an unprincipled and unsystematic procedure. Thus it is essentially necessary to gain some practical knowledge of a business before we actually undertake it.

The present article on 'Dairy-Farming' is intended to bring home some of the most elementary but essential points concerning this business to the honest reader who has an inclination for the same.

The physical conditions of the different countries of the world have determined in each case the most suitable animal for dairy purposes. The milking of ewes, for example, was once a common practice in Great Britain, but it has fallen into disuse because of its hurtful influence upon the flock. The cow is, however, now the only animal used for dairy purposes.

At present the two main castes of dairymen in India, as Sir George Watt observes, are the Ghose's and the Gwallas; but their duties so far as the disposal of their produce is concerned differ from each other to some extent. The former are only milkmen who dispose of their milk and curd to the Halwais while the latter are cultivators as well as milkmen and deal directly with the public in general. But the adulteration of milk has become so common that in either of the two cases, it is something impossible to get the pure thing no matter how much is paid for it. The removal of cream and the addition of water are the worst means of impoverishing the milk. The admixtures of chalk, flour, etc., are also not very uncommon and these can not but prove extremely injurious to the health of the consumer.

This sophistication of milk can sometimes be detected by the lactometer or milk hydrometer, an instrument for determining the specific gravity of the milk, which is, of course, reduced if water only is added. But artful dairymen frequently bring up the specific gravity to the proper standard by dissolving salt or sugar in the diluted milk, so that this test can not be implicitly relied upon. The indication of the 'gravity-lactometer' should be combined with the use of a set of graduated tubes, in which to ascertain the number of measures of cream which rise from 100 measures of milk in 24 hours. And it is also to be recommended to ascertain the opacity of the sample by means of lactoscope.

The adulteration of butter which requires our deepest attention consists chiefly of melted fat brought from the butchers in the form of sweet or otherwise and mixed with the butter often undergoing a certain process. These contaminations are chiefly repulsive and disgusting to refined palates. The easiest way of testing butter is to melt a little of it in a glass tube plunged in hot water. After a time the water, the curd or casein and the true butter or milk fats separate into layers. There should be 8 to 13 per cent. of water in good butter, so the watery layer should not exceed in volume one-eighth of the whole butter. Nor should the casein or curd be very conspicuous.

The stunted growth of our child population and the increasing infant mortality are nothing but the outcome of all these irregularities. It is highly desirable, in these circumstances, that dairy farming business be encouraged, established and organised by every patriotic son of India.

The attention of the dairyman must also be drawn towards the various cattle diseases which are so prevalent nearly in each and every corner of India. As it is not possible in this short article to enumerate all such diseases with the symptoms and treatments, it may suffice here to mention that the services of a veterinary doctor must be called for at least once a month. This will cost little and save much.

The amount of capital to be invested in the business is as well an important question whose solution affects the dairyman. If the dairy farming business is

not opened on a grand scale and a substantial amount is not invested in it, it will not be possible to meet the demands of the customers timely and properly, and hence the business is likely to suffer. To give an accurate figure of the capital required is difficult, but this much can be said that the approximate outlay for cattle, lands, building, utensils, implements, etc., will be about fifty thousand rupees to keep up about hundred cows. For the sake of economy, it may be here pointed out that in the beginning of the business, some rented lands and houses may be hired instead of buying and building, because by this procedure, a good deal may be saved which may be utilized for other important and urgent purposes.

The position of the dairy is also an important fact which may be discussed here briefly. If it is situated in the town and far from the Railway station a great deal of trouble and expense will have to be undergone in sending the products to other places. At the same time, if it is not situated in the town, local customers have practically little chance of encouraging the business and this is highly detrimental to its success. To avoid both of these defects, it is advisable to have the main factory just close to the Railway station and open a small shop in the town under the management of some reliable men, in which the dairy products may be supplied by the farm according to the demand of the local public.

As the success of the dairy farm depends greatly upon the cows in the dairy it is extremely necessary to have a good selection of them at the time of

purchasing. It is of course no saving if cheap cows are purchased for they consume much and yield little.

The importance of ascertaining not only the quantity but also the quality of the milk cannot be overlooked by the successful dairy man.

The last and the most fatal difficulty in the way of the dairy man is the dishonest dealing of the servants employed by him. This difficulty, however, he can only surmount by keeping well-paid servants and dispensing with the services of those whose honesty is in the least doubted.

In conclusion, we enumerate here some of the rules in a cut and dried form which are necessary for the success of every dairy-farm.

THE OWNER AND HIS HELPERS.

1. Utmost cleanliness must be observed and enforced regarding the cattle, their attendants, the cow-house, the dairy and the utensils.

2. A person suffering from any disease or who has been exposed to a contagious disease must stay away from the cows and the milk.

THE COW HOUSE.

1. The dairy cattle ought to be kept in a shed or building

2. Cow-houses should be well-ventilated, lighted and drained.

3. The cow-house must be white washed at least once or twice a year.

4. No dry or dusty food should be given to the cow just previous to milking; if the fodder is dusty it ought to be sprinkled before it is fed.

5. The cow-house ought to be thoroughly cleaned and aired before milking; in hot weathers the floor ought to be sprinkled.

THE COWS.

1. The herd must be examined at least 4 or 5 times a year by a skilled veterenarian.

2. Any animal suspected of being in bad health should be at once removed and her milk rejected.

3. The cows should not be made to walk faster than a comfortable rate while on the way to the milking or feeding.

4. The cows must be fed liberally; only fresh, palatable feed-stuffs should be used.

5. Salt should always be accessible to the cows.

6. Within twenty days after calving, the milk should not be used.

MILKING.

1. The milker should be clean in all respects; he should wash and dry his hands just before milking.

2. Cows do not like unnecessary noise or delay. So they ought to be milked quietly, quickly, cleanly and thoroughly. The time of milking should be the same every day.

3. The first two or three streams from each teat should be thrown away; this milk is very watery and of little value.

4. If any accident occurs by which a pail full or partly full, of milk becomes dirty, it should not be remedied by straining but all the milk should be rejected and the pail rinsed.

Small Trades & Recipes.

Ink Powder.

Finely-powdered nutgalls 10 oz., sulphate of zinc (powdered) 4 oz., sulphate of iron (powdered) 4 oz., gum-arabic (powdered) 1 oz.; 1 oz. of this powder when finely sifted, added to about $\frac{1}{2}$ pint of water and well shaken, will form a good ink.

Paste for Mounting Photographs.

Mix thoroughly 630 gr. of the finest arrowroot with 375 gr. of cold water in a capsule, with a spoon or brush; then add $10\frac{1}{2}$ oz. of water and 60 gr. of gelatine in fine shreds. Boil, with stirring, for 5 minutes, or until the liquid becomes clear, and when cold stir in well 375 gr. of alcohol, and 5 or 6 drops of pure carbolic acid. Keep in well closed vessels, and, before using it, work up a portion with a brush in a dish.

Gypsum Plaster.

(1) Plaster of Paris, baked and ground, acquires great hardness and solidity when left for twenty-four hours in contact with a solution of alum, and when, after drying in the air, it is submitted to a second baking. (2) Still better results are obtained by employing an aqueous solution containing 1120 of borate and 1120 of cream of tartar; the plaster, baked and in fragments, is plunged into this solution until it is saturated; then it is calcined, and pulverized. (3) A mixture of silicate of

potash, 100 parts; carbonate of potash 27 parts; and water, 500 parts, may also be used.

Ice Cream.

(1) **Cream.** Pure Cream, 2 gal.; sugar, 2 lb. flavouring, as desired. Mix well, and freeze.

(2) **Egg.** Milk, 2 gal.; sugar, 4 lb.; flour, 4 oz.; eggs 12, common salt, 1 dr.; flavouring as desired. Mix the flour, sugar and salt with $\frac{1}{2}$ qt. of the milk, add the eggs, which should be well beaten, and the flavouring. Heat the milk to boiling mix all together, boil for a few minutes, let cool, strain, and freeze.

(3) **Fruit Ice Cream.** Milk, 1 pt., sugar, 2 cupfuls; flour, 1 tablespoonful; eggs, 2; gelatine 2 tablespoonfuls; soaked in a little water; cream, 1 qt.; bananas, 4; and other fruits if desired. Let the milk come to a boil beat the flour, sugar and eggs together, and stir in boiling milk. Cool 20 minutes, then add the gelatine. When cold, add the cream. Put in the freezer, freeze 10 minutes, add fruit, and finish freezing.

(4) **Lemon.** Six large lemons; cream 1 qt.; sugar, 12 oz., or $\frac{1}{2}$ pt. of syrup. Grate the peels of 3 lemons into a basin; squeeze the juice to it, let stand for 2 or 3 hours, strain, add the cream and syrup, and freeze, or mix as orange.

INDIA'S INDUSTRIAL PROGRESS.

Industrial Institute of Madras.

Acting on the recommendation of the Director of Industries, the Madras Government has been pleased to sanction the retention, on a temporary basis, of the Government Industrial Institute, Madras, until March 1927. Since its removal to the present premises the scope and activities of the institute have increased greatly. Progress in various directions has been rapid and is evidenced by the large output and sales. The Institute has demonstrated that superior inks can be manufactured in Southern India on scientific lines.

Paper Pulp in Bihar.

During the year 1924-25, the Director of Industries, Bihar and Orissa, arranged for a consignment of ten tons of bamboos from the Angul forest to be sent to Dehra Dun in order that the paper pulp expert, might complete his large scale tests. This he did satisfactorily during the year and he has now published his conclusions. It appears from his report that his process is completely successful and the prospects of a paper pulp factory at Cuttack based on the Angul forests appear very good. It remains now for private enterprise to take advantage of this opportunity, and an application for assistance under the Bihar

and Orissa State Aid to Industries Act will no doubt receive sympathetic consideration from the Board of Industries.

Handloom Factories in U. P.

The main centres of the industry are Muzaffarnagar and Najibabad though blankets are made in practically every district in the province. The quality of the articles turned out by the members of co-operative societies at Muzaffarnagar and Najibabad is good, and some of the cloth compares by no means unfavourably with that of European manufacture except in finish, improvement in calendering being necessary. The weavers have to contend with competition from foreign countries, but the articles made in the province find a ready sale. The main hindrance to improvement in the position of the industry is the difficulty in obtaining a sufficient supply of yarn. The bulk of yarn used is spun on the country *charhha*. The process is a slow one and the yarn is not uniform. It is unsuited for better kind of cloth. Machine-spun yarn is preferred, but it is not always procurable and the prices are high. It has been decided to start a small demonstration factory at the Government Textile School, Cawnpore, where there is an efficient staff for running a factory worked by motor.

SCIENTIFIC AND TECHNICAL TOPICS.



Pulling Light to Pieces.

The astronomer studies the sun by "taking it to pieces." The instrument employed is called a spectro-heliograph, and is really a highly developed form of spectroscope. The spectroscope, as most people know, is an instrument designed to analyze light. It consists of a tube, at the forward end of which is a fine adjustable slit, to regulate the amount of light entering the instrument, while at the inner end there is a collocating lens to render the rays of light parallel before they enter the dispersing system.

Now, when the spectroscope is applied to the sun, instead of an image formed in the usual way, we see a lovely coloured ribbon of light, violet at one end and red at the other, with every conceivable shade of colour between. This is due to the light of the sun having been sorted out into its various constituent parts and ranged in order of wave-length. This coloured spectrum is seen to be crossed by an enormous number of fine dark lines, indicating the presence of definite chemical elements in the sun. Each element is responsible for a particular line or set of lines.

Uses of Seaweed.

From seaweed science has enabled us to obtain a number of products, including agar-agar—a jellylike substance invaluable to the medical profession,

potash, cattle food, manure, and fibre for use in upholstery and similar work. Agar-agar, which is semi-transparent and shiny in appearance, is the best known food for microbes, many varieties of which thrive on it exclusively. This is its important use, but it is also employed as a curative agent in certain kinds of wounds or injuries, and experts predict that in time it will displace many of those drugs which, while they are valuable in different ways, often have baneful after-effects. In addition, it forms a constituent of jellies and soups and is used for making moulds in plaster-of-Paris, clarifying certain liquors, beer and wines among them, and for stiffening the texture of silk and other materials. Another seaweed product is a form of isinglass far superior to the vegetable substance; while photographic films, iodine, and algin, a particularly sticky kind of adhesive paste, are being made in increasing quantities from the same source.

Dust As Motor Car Fuel.

Scientists have recently found out that dust may be used as a motor fuel instead of gasoline. There is a strong possibility that a four or six-cylinder internal combustion engine using carbonaceous dust as a fuel will be soon developed. A device which corresponds roughly to a one-cylinder combustion

engine has been demonstrated. Small quantities of carbonaceous dust, such as powdered sugar, corn starch, cocoa, pulverised wood, and even finely ground spices or coal dust, are confined in the mechanism, thoroughly mixed with air and exploded with an electric spark.

The dust must consist of carbonaceous particles. It will not be sufficient merely to suck into the cylinders the road dust created by the motor car, but the dust must be such as collects on many factory floors, constituting an explosion hazard. Dust from sugar, cocoa, cinnamon, leather, flour, rubber, aluminium or wood would be suitable.

A New Vitamin.

Another discovery with regard to the behaviour of the vitamins has been made by American scientists. It is now known that the vitamin that prevents rickets is distinct from Vitamin A, whose specified function is the promotion of normal growth, and to the former the name Vitamin D. has now been given. The new discovery is that Vitamin D, which is present in considerable quantity of milk, is increased when the milk is exposed to ultra-violet light either from the sun or from some artificial source. On the other hand, Vitamin A, which is also a characteristic ingredient of fresh milk, is destroyed by the same process. At least, this is the conclusion to which certain experiments like-wise reported to the annual meeting of the American Chemical Society clearly point. In these experiments one set of chicks fed with milk that had been exposed to ultra-violet light developed the usual conditions typical of the lack of Vitamin A, while a second group fed with untreated milk developed normally.

The Astronomer's Snapshots.

The spectro-heliograph differs from the simple spectroscope in having the slits made long enough to span the whole disc of the sun. Also, behind the first slit there is a second movable slit, which

can be placed to let through the light coming from any particular line in the spectrum and exclude the rest.

The light passing through the second slit falls on a photographic plate. This is mounted on a moving carriage, the speed of which can be regulated so that the plate keeps pace with the diurnal motion of the sun.

As the sun moves slowly in front of the first slit, so does the plate behind the second one, and in this way a picture of the whole disc of the sun is built up. The picture really consists of successive narrow strips side by side. In this way, by choosing successive lines, and suitably placing the second slit, we can obtain photographs of the sun by the light of any element we please, and thus study the distribution of that element in the sun.

Bombardment of Atoms.

The most minute electrical particle is known as the electron, 1,840 of which weigh no more than the smallest atom, the atom of hydrogen. These electrons are more or less loosely attached to the atoms of all kinds of matter; so loosely that they can be rubbed off a piece of glass with a handkerchief, as is shown by the fact that the glass is thereby electrified.

Free electrons are obtained from the atoms of nitrogen by bombarding them with what are known as alpha particles, which are themselves fragments of helium atoms blown off when the metal radium decomposes. They carry a double charge of positive electricity and are projected from the exploding radium atom at a speed of some twenty thousand times as fast as a rifle-bullet. Their momentum is so great that they plunge right through the atoms they encounter and may travel several inches through the air before they are slowed down, leaving behind a trail of some 200,000 fragments of nitrogen atoms. These fragments being electrified, may each form the centre of a minute dew-drop.

FORMULAS, PROCESSES & ANSWER.

Preserving Potato.

507 A. S. B., Sialkot.—Asks for some hints on preserving potatoes.

For preserving potatoes in store, the floor is sprinkled with fine quicklime; this is covered with a layer 4 or 5 in. thick of potatoes; this by a sprinkling of quicklime again, and so on using the lime in the proportion of about 1 measure to 40 measures of potatoes. This method checks disease when it is present, and improves the potatoes if they are watery or waxy. Layers of straw and powdered plaster of paris may be substituted for the lime

Bromide Paper.

433 K. B., Rookee—Requires a formula for bromide and printing out paper.

Gelatine, 42 gr; bromide of potassium, 26 gr.; distilled water, 1 oz. Soak the gelatine in part of the water, and dissolve with heat on a water bath. When completely dissolved, add silver nitrate, 32 gr; water, 1 oz; to be added slowly, and with constant stirring. Digest at a temperature of 85 degree F. for an hour or more in the dark. This may be done conveniently by having the emulsion in a stoneware bottle. Pour out to set; then make into shreds by squeezing through the bottom of a coarse canvas or fine net bag. Put the shreds in a bag, and wash in 2 or 3 changes of water.

Squeeze out the water, and dry the shreds between sheets of canvas, then remelt for coating. Coat on baryta-faced paper. The whole of the operations after the silver is added to the gelatine (including coating, drying, and storing of the finished paper) must be conducted in darkness or in a dark-room light.

Printing out Paper.

(a) 4 per cent. celloidin collodion, 620 cc; ether, 100 cc; alcohol (.796), 30 cc. (b) Silver nitrate, 25 grains distilled water, 25 cc.; alcohol (.796), 120 cc. (c) Calcium chloride crystals, 4 grains; distilled water, 4 cc.; alcohol 5 cc. (d) Citric acid, 5 grains; distilled water, 5 cc.; alcohol (.796), 30 cc.; (e) Castor oil solution (1 of oil in 2 of alcohol) 15 cc.; glycerine solution (glycerine, 1; alcohol, 2), 15 cc. (b), (c), (d) and (e) are added to (a) in this order with copious shaking. Gives paper especially suitable for separate toning baths.

Sympathetic Ink.

622 J. L. P., Surat—Wants a recipe for sympathetic ink.

Write with a solution of cobalt chloride and the writing, while dry, will not be perceptible; but if held towards the fire, it will then gradually become visible; and if the cobalt chloride be made in the usual way, the letters will appear of an elegant green colour.

Drawing Pastels.

661 P. S. C., Lahore—Wants a recipe for making crayons for drawing.

Take three quarters of a pound of blue clay, three quarters of a pound of the colouring required, such as vermilion, chrome, Prussian blue, orpiment, etc., 2 ounces of turpentine, 4 ounces of spirits of wine, and 6 ounces of fine shellac. The clay must be well mixed with water, passed through a fine lawn sieve, and allowed to subside; the water is then poured off and the clay dried. The shellac must be dissolved in the mixed turpentine and spirit with a little warmth. The dry clay and the colouring, must be blended in a mortar, and then the shellac mixture added and well incorporated till the whole is a doughy mass; it is then to be rolled out into a pencil form and dried with stone heat. To make the crayons of uniform substance, the paste may be placed in a cylinder, with a hole at one end and a piston at the other, the "wormy" pieces that pass through are then cut into proper lengths and dried.

Photographic Developer.

715 M. R. R. I., Salem—Wants a recipe for preparing photographic developing solution.

The following is the recipe for the well known hydroquinone developer.

Motol	40 gr.
Hydroquinone	36 gr.
Potassium metabisulphide	15 gr.
Sodium carbonate	1 oz.
Sodium Sulphite	$\frac{1}{2}$ oz.
Water	14 oz.

For use, take 1 part developer and 1 part water. Two drops of a 10 per cent. solution of potassium bromide should be added to each ounce of the diluted developer, except in cases of under-exposure or where special softness is desired. This developer is admirably suited for hand-camera exposures, as well as for bromide and gas light papers, giving with the latter beautiful velvety black prints. It is also well adapted for all kinds of ordinary work.

Violet Ink.

592 M. L. V., Agra—Wants recipe for a violet ink.

Place 2 dr. of crystallised carbonate of soda and 1 oz. of extract of logwood in a porcelain receiver with a oz. of distilled water. Heat this until the solution reaches a deep red colour and everything is quite dissolved. Then remove it from the fire and stir in 1 oz. of glycerine, 15 gr. of neutral chromate of potash and 2 dr. of finely pulverised gum arabic, each of the latter dissolved in a little water.

Litharge and Its Properties.

559 J. F. D., Myingyan—Asks what is litharge and what is the solvent for it.

Litharge is a monoxide of lead obtained by oxidising lead, at a bright red heat, by exposing it to a current of air. On cooling the mass, the litharge separates, forming a brown semi-crystalline mass which separates into scales commercially known as flake litharge; this when ground to a powder, constitutes the powdered litharge sold in the market. It is also obtained at a

byproduct by liquefaction from argentiferous lead ore. It is soluble in dilute acetic and nitric acids, forming acetate and nitrate of lead. It is also dissolved by boiling with hydrochloric acid, forming chloride of lead, whilst sulphuric acid forms the sulphate of lead. Litharge is an exceptionally powerful drier, and is much used in the preparation of boiled oils and varnishes.

Saddle Soap.

341 M. C., Peshawar —Wants a recipe for saddle soap and black boot polish.

To make saddle soap, gently heat over a slow fire, constantly triturating till thoroughly incorporated, 1 lb. of beeswax, 8 oz. of soft soap, 2 oz. of linseed oil, and $\frac{1}{2}$ pint of oil of turpentine; put in pots or tins. Rub a very little well into the saddle and polish with a soft brush.

Black Boot Polish.

A black water-proof polish for boots and shoes, may be made as follows. Procure 3 oz. of nutgalls, 2 oz. of borax, $1\frac{1}{2}$ lb. of lac, 1 dr. of aniline black, and 3 oz. of ivory black or lamp black. Place the nut-galls in 1 gal. of water, and simmer over the fire until all the tannin is extracted. The liquid is then strained replaced on the fire, and raised to boiling heat; the borax and lac are then placed in, and the mixture is simmered until the lac is thoroughly dissolved, after which the aniline black may be added, followed by the lampblack. The mixture is allowed to stay on the fire a few moments, constantly stirring, then taken off the fire and passed through a fine strainer

when it is ready for use. The mixture is applied to the leather by means of a sponge or brush; it dries with an enamel-like surface which is quite water-proof. The composition should be thoroughly stirred or shaken before using.

Fluid Disinfectant.

728 D. T. C. I., Madura —Wants to manufacture fluid disinfectant.

This can be made by dissolving soft soap in crude carbolic acid or coal tar oil. Crude acid or oil (1 gal) should be heated gently in a pan, and 1 lb. to 2 lb. of soft soap should be added; the mixture should be stirred until the soap is properly dissolved, and then allowed to cool.

Soap Powdered.

738 D. D., Dacca —Wants a recipe of changing soap powder.

Shaving soap powders are pure curd soap pulverised and mixed with starch, almond paste, or powdered orris-root. These additions serve a double purpose; many very sensitive skins cannot even bear pure neutral curd soaps, their use causing an unpleasant sensation of dryness. This is alleviated if soaps with the above additions are used, their presence also causes the latter to be more permanent. By mixing 20 to 25 parts of starch with 100 parts of soap powder a shaving powder is obtained which gives a fine, permanent lather. This powder is generally supplied white, but it is also coloured rose; by mixing a little cinnabar in it. Before mixing the starch into the powdered soap it is perfumed and, if

necessary, coloured, the colour and perfume being very carefully ground up, and when thoroughly mixed up together the whole is passed through a not too fine sieve. If the perfume is added to the powdered soaps it forms small balls which in spite of all trouble cannot be entirely got rid of, and finally remain upon the sieve.

The perfume usually employed for white shaving powders made with starch is a mixture of lavender oil, oil of thyme, oil of caraway and fennel oil; for rose powder—geranium oil, palmarosa oil, and a little oil of cloves and for finest rose shaving powder—geranium oil, rose oil, and bergamot oil.

Dyeing Cotton With Logwood.

752 P. C. B., Chuadar a.—Desires to dye cotton with logwood.

The one-bath method of dyeing black on cotton with logwood has been much in vogue at one time. Copper sulphate, soda ash, and logwood extract are the materials required. These details may serve as a guide in the production of the black. For each 100 lb. of cotton a liquor is prepared containing 60 lb. logwood extract, 51 deg. Tw., 6 lb. soda ash, and 3 lb. copper sulphate. The material is worked in this at the boil for a time, removed, drained or squeezed, and allowed to lie for a time until the full shade is developed, turning over occasionally. For a second lot of cotton in the same liquor add 40 lb. logwood extract, 4 lb. soda ash, and 2 lb. copper sulphate; and for a third and standing liquor 20 lb. logwood extract, 3 lb. soda

ash, and 1 lb. copper sulphate. The fastness of the resulting black to washing and to milling may be greatly improved by after-treating the material for twenty minutes with 1 per cent. bichromate of soda.

Extraction of Chlorophyll.

723 K. B., Faizpur.—Writes, Can you throw some hints as to how chlorophyll may be extracted?

The usual method of extracting chlorophyll from green tissues consists in first steeping the fresh material in hot water to destroy oxidizing enzymes and then extracting the colouring matter by means of warm alcohol. A German chemist, however, recommends the use of dried in place of fresh material, and extracting by shaking with organic solvents (ethyl or methyl alcohol, ether or acetone) in the cold.

(1) Half a kilo of dried material is spread on a porcelain Buchner funnel in a layer of not more than 4 to 5 cms. thick, and 1.5 litres of solvent are drawn through this layer by means of a filter pump in the course of half an hour. This filtrate, measuring about 0.9 litres, contains from 4.25 to 4.5 grains of chlorophyll.

The solvent employed may be either 90 per cent. (aqueous) alcohol or 80 per cent. (aqueous) acetone.

(2) Two and a half kilos of fresh leaves are ground up in a mill and shaken in a bottle with 1.5 litres of acetone to remove water and mucilage and to stop enzyme action. The acetone is then filtered off on a pump; it contains no chlorophyll. The residue is then freed

from acetone by filtering on a pump under a pressure of 200 atmospheres, and the resulting hard mass, weighing 0.8 kg., is broken up and ground again. On adding 1.5 litres of acetone the latter becomes diluted to 80 per cent. by the water still remaining in the residue; the mixture is shaken for 5 minutes and a further quantity of 1 litre of 80 per cent. acetone is now added. The liquid is filtered off on a pump and the residue treated three times with half a litre of 80 per cent. acetone. The total filtrate should measure 3.7 litres and contain 4.7 grains chlorophyll.

Bleaching Fish Scales.

833⁶ N. R. R., Shimoga.—Asks how fish scales can be bleached?

The fish scales are first cleaned in a suitable manner, until they appear transparent and horny. The large scales of fresh fish are the most suitable. Old scales are useless, since they have lost their elasticity and transparency. In another method the fresh scales are first treated for twenty four hours with clean salt water in order to loosen and remove partially the upper layers. They are then washed in distilled or clean rain water, which is renewed every two to three hours. This is done five or six times. The scales are then separately and carefully rubbed with a fine linen cloth, gently squeezed in a press to remove moisture, and finally are laid for an hour in spirit, and again, as before, rubbed and pressed until dry. They have now the appearance of mother-of-pearl, and are very elastic and durable. They may either be used without further

treatment, or may be coloured as required by soaking in dyes.

Essential Oil.

723 K. B., Faizpur.—Wants to know how certain essential oils are obtained.

(1) CAJEPUT OIL.

The cajeput tree, *Melalencia Lencandendron*, indigenous to the Moluccas and Sunda islands, contains in its leaves, bark and branches a volatile oil which is obtained by distilling the comminuted branches together with the leaves and water. The oil is also obtained from other varieties of *Melalencia*. The principal mass of the oil is contained in the leaves, which yield 0.54 per cent.

(2) OIL OF TURPENTINE.

For the commercial production of turpentine oil the representatives of the genus *Pinus* are used almost exclusively. The *Pinacea*, which come primarily under consideration in this industry, grow principally in dense forests in the temperate zones. In their schizogenous ducts they contain a resinous balsam known as turpentine. When the tree is wounded artificially the turpentine begins to flow. When the bark is removed and the cambial layer is injured the turpentine exudes as a clear or turbid, viscid liquid, consisting of a solution of resin in volatile oil. Upon distillation of turpentine, whether by itself or with water vapour, turpentine oil passes over and colophony remains. This is purified by remelting and straining.

(3) CAMPHOR OIL.

Borneo Camphor oil is obtained by making incisions in the bark of the tree and collecting the oil which flows out as

a thickly fluid turpentine-like mass, or by boiling the comminuted portions of the tree with water.

Soapstock from Rancid Oil.

680 P. C. D. R., Cocanada.—Enquires whether soap stock can be prepared from rancid oils.

The stock soaps which are used in making milled soaps should be of good quality, made from fresh and pure fats and oils, well boiled with good caustic soaps to be thoroughly saponified. Rancid and discoloured fats and oils should not be used, such tend to rob the perfumes used in making the soap of much of their aroma and delicacy—a thing which is to be avoided.

Tallow makes a good stock soap for milling. Both unbleached and bleached palm oil yield excellent soap for this purpose, although it is important to see that the oil is not rancid and has the agreeable violet-like odour of fresh palm oil to perfection. Coconut oil also makes a good soap; great care ought to be taken with it to see that it is thoroughly saponified. Cotton seed oil does not make a good stock soap for milling. Castor oil yields a fair soap; other fats and oils are not admissible for various reasons.

Utilisation of Oil Foots.

669 B. N. B. C., Ajmer.—Asks, "Can oil foots be utilised in any way?"

In the alkali method of refining oils a large quantity of "foots" is formed. These may be utilised in various ways according to their character. One very good method is to work them up for soap

making in conjunction with other fats. Cases, however, occur where, owing to their being strongly coloured as in the case of cotton oil foots, this cannot be done. The best plan of dealing with such is to decompose the foots by weak sulphuric acid and distil the liberated fatty acids, etc.

Vegetable Fat.

• 459 A. D. B., Bilimora.—Writes, Can you throw some light on the composition of vegetable fats commonly known as "artificial ghee."

• The vegetable fats are classified into those which approximate coconut oil and palm kernel oil in containing large proportions of volatile soluble and insoluble fatty acids, and vegetable tallows, such as cacao butter, characterised by their higher proportion of non-volatile insoluble fatty acids.

Of late a number of products have appeared on the market under the names of "vegetable butter" and are offered as substitutes for ghee. These consist chiefly of carefully refined and deodorised coconut oil and palm kernel oil, materials which have more recently been supplemented by the addition of margosa oil, shea butter, and mowha seed oil. Any suitable mixture of these or similar fats may be churned with milk, coloured, and salted, and finished off like genuine butter.

The now simple process of producing a hard fat from a liquid oil has led to the substitution of such hydrogenated oils for the mixtures of fats and oils which were previously used for such purposes

as artificial lard and margarine. For products which formerly consist of cotton seed oil with sufficient oleostearin to make the mixture semi-solid, cotton seed oil alone, hardened to the desired extent by hydrogenation, is now frequently employed. Some manufacturers blend hydrogenated oils with fats which have not been hydrogenated, the hardened oil thus taking the place of oleostearin, but it is preferable to use a single oil hydrogenated to the necessary consistence since the resulting product is superior both as regards its keeping properties and its palatability.

Compounding of Grease.

472, D. A. S., Lahore —Requests us to throw some hints on the compounding of grease.

1. MACHINERY GREASE

Mutton Tallow	40 lb.
Yorkshire Grease (saponifiable)	16 ..
Russian Oil (908)	28 ..
Soda Crystals	28 ..
Water	112 ..

Melt tallow and stearine together; dissolve soda in the water and add the fat thereto at a temperature of 120 degree to 130 degree F, and when thoroughly combined gradually work in the oil, well agitating.

These greases are much liked for loco purposes on account of their splendid wearing and cooling properties.

2. AUTO-FRICTION GREASES

(a) Soft Resin oil	112 lb.
Talc	28 ..
(b) Soft Resin oil	98 ..
Palm Oil	10 ..
Soda crystals (liquefied)	4 ..

Size for Hardening Yarns.

697 H. N. M., Surat.—Wants to stiffen yarns by sizing.

Make a paste of 22 gallons of water and 66 lb. of potato starch, add 11 lb. of glycerine and $5\frac{1}{4}$ lb. of good, pure curd soap, and boil by steam for fifteen minutes, until a perfectly uniform consistence is attained. Then stir in 2 oz. of crystallised salammmoniac (previously dissolved).

Oxalic Acid.

809 T. C. Bhusawal—Asks, "How is oxalic acid prepared?"

The old way of making this compound was to heat a mixture of saw dust and caustic soda together at a temperature of about 240 degree C. The mass thus formed was extracted with water evaporated, and treated with milk of lime. The calcium oxalate, on being treated with sulphuric acid and again evaporated, gave the oxalic acid. At present it is made by an improved process which consists in heating a mixture of potassium formate or carbonate with a little potassium oxalate and a slight excess of caustic alkali. It has recently been discovered that sodium can be used in place of potassium. The oxalic acid is then freed from this mass by means of sulphuric acid. It forms transparent crystals having two molecules of water.

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- 588 K M K, Twante.—For the apparatus required write to The Magical Co, Jhansi
- 589 T. M. Colombo.—No such automatic coconut scraping machine is available
- 593 R A D, Ahmedabad.—Electro blocks are made by B. N. Bysack, 111, Ram Chand Ghose Lane, P. O. Beadon Street, Calcutta For patent registration enquire of P. Lodge & Co, P. O. Box 6772, Calcutta
- 594 T T C, Shikarpur.—For disposing off the articles you deal in advertise in the pages of newspapers and periodicals.
- 598 V O K, Travancore.—Rope makers will take your coconut fibre You may make arrangement with local rope manufacturers
- 599 K B, Razole.—Glass bangles may be supplied by S Komai Glass Manufacturing Co, 4 Chome, Minami Honmachi, Higashi-ku, Osaka and Nishiumi Sakujiro Shoen, 49 Shichome, Minami-Kyuhajimachi, Osaka, both of Japan As regards Indian firms you may enquire of F P Nalladaroo & Co, 5011, Canning Street, Calcutta, S Abdul Aziz, 52, Canning Street, Calcutta and S Aktar Hossain Ansari, Mohaulla Kotla, Firozabad, Agra
- 601 G C M, Lahore.—An article on paper manufacture appeared in April 1925 issue where you will find process of preparing paper pulp
- 602 B K T, Ajmer.—Tooth powder of good quality is manufactured by Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square, Calcutta
- 603 B. L. G N, Benares City.—Woollen goods may be supplied by Woolweberci Spiegel & Co G. m b H, Baden-Baden, Germany; Tannenbaum, Parisar & Co, G m b. H. Bischofstrasse 19-21 Berlin C2; Anglo-Dutch Woollen Co Ltd., 54, Conduit Street, London W1; and Anderson David & John Ltd, Gresham Street, London E.C.2 Stationery goods may be supplied by Barclay & Fry Ltd, The Grove, Southwark Street, London S.E.1; King Brothers 15, Bury Street, St. Mary Axe, London E.C.3, Edward Dressler, Ritterstrasse 71, Berlin S.W.68 and S G Kegler & Co, Rosmaring 3, Dresden, Germany. For optical goods enquire of American Optical Co., Ltd, 39, Hatton Garden, London E.C.1; Standard Optical Co., 26 & 27, Hatton Garden, London E.C.1, Kirmse Edmund, New market 3, Leipzig, Germany; Tornier Fpfx, Konigsplatz 36, Leipzig, Germany, Dupaul Young Optical Co, South Bridge, Massachusetts, USA and General Optical Co Inc Mt Vernon, New York USA Other addresses you require appear regularly in these columns
- 606 R S K, Rampore.—For learning motor mechanic you may correspond with French Motor Car Co, Ltd, 23413, Lower Circular Road and Great Indian Motor Works, 25-29, Park Street, both of Calcutta As regards allowances write direct to the parties Wants to buy bituminous non-coking coal for working suction gas producer plant Can supply fine powder of the bark of Kikar tree.
- 609 M Q R C, Madhupur.—As referred by you q.s. is the abbreviated form of as required Most of the ingredients mentioned in the glossary may be bought of Jadu Nath Ghar, Hukaputty, Barabazar, Calcutta.
- 610 P C T, Travancore.—Recipes of shellac spirit varnish will be found in November 1925 issue An article on boot polish appeared in June 1923 issue
- 612 P K C, Raipur.—Glass beads and corals may be supplied by Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta Yarn may be supplied by Japan Cotton Trading Co., Ltd, D-3, Clive Bldgs, Clive Street and Adamjee Dawood & Co, Ltd, 55, Canning Street; both of Calcutta. Fancy goods may be had of K. G. Maniar, 557, Canning Street, Calcutta, Mahomedbhoy Jivabhoy & Co, Nizam Street, Bombay 9 and The Union Trading Co, 166,

Harrison Road, Calcutta. Pearlash may be bought of Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square, Calcutta. Indigo may be had of Bansidhar Dutt & Sons, 126, Khengraputty, Barabazar, Calcutta.

613 H. J. J., Akola—You may go through Woodworker published by Evans Bros Ltd, Montague House, Russel Square, London W.C.1

614 A. S., Benares—Can supply old rubber goods or cycle and motor tyres, etc and broken glass.

617 V. K. J., Kallai—For manilla paper write to Shambhu Ch Sinha & Co, 175, Old China Bazar Street and Bhola Nath Dutta & Sons, 134, Old China Bazar Street, all of Calcutta.

618 M. O. O., Paddhari—You may go through The Sheep and Its Skin by Alfred Seymour-Jones

619 L. T. L., Mandalay—For small hydraulic press enquire of Marshall Sons & Co, Ltd, 99, Clive Street and Burn & Co, Hongkong House, Council House Street, both of Calcutta

620 D. P. P., Bombay—Yes, there is ample scope for toilet articles; you may manufacture tooth powder, tooth paste and hair oil. You may have your firm registered when no one will be able to open business under the same name. For trade mark registration write to P. Lodge & Co, P.O. Box 6772, Calcutta. It is very difficult to enumerate the names and addresses of firms manufacturing tooth powder. The processes of refining vegetable oils consists in treating the oil with animal charcoal in the proportion of four to one by weight. Animal charcoal should be finely powdered before it is mixed to the crude oil. The whole is put in glass or china jars and covered over with a lid and is then exposed to the rays of the sun for 15 days successively. Impurities are absorbed by the charcoal and on filtering refined oil is obtained. Hindi equivalents of "Chaulmugra" are "chalmugra, chhalmugra" and "chavul-mungri." Hindi equivalents of orris roots are "irsra" and "sosun." Venetian red is a kind of dye. Other vernacular equivalents are not known.

621 P. C. J., Kottayam—For tapioca enquire of Banshi Dhar Dutt & Son, 125, Khengraputty, Bara Bazar, Calcutta.

623 J. H. S., Bhatkal—You can find the strength of the caustic lye by experiment.

624 M. H. A., Baghdad—Jeweller's tools may be supplied by L. Basack & Co, 5 Old Court House Corner, Calcutta. Rubber stamp making materials may be bought of S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta. An article on etching copper and steel plates appeared in April 1923 issue.

626 R. B. S., Chanda—Send samples of the soap for analysis to Dr. Ghose's Laboratory, 5, Cooper's Lane, Calcutta.

629 V. P. K., Koslanda—Chemicals may be bought of B. K. Paul & Co, 1-3, Bonfields Lane, Calcutta and Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square, Calcutta. For soap stamping machine and candle making apparatus enquire of Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta.

632 S. S., Raghunathpur—For the book required enquire of Chackraverty Chatterjee & Co, Ltd, 15, College Square and The Book Co, 44A, College Square, both of Calcutta.

633 M. A. R., Kymore—For corks enquire of Kalidas Dutt & Co, 8, Ezra Street, Calcutta.

634 M. D. T., Shikarpur—Recipes of hair dyes appeared in January 1925 issue. For analysis you may send sample to Dr. B. Ghose's Laboratory, 5 Cooper's Lane, Calcutta.

Kaminia Oil

(Regd.)

Finest dressing for the Hair Delicately perfumed. Re 1/- per pot charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmun flowers. Lasting delicate odour reminding a garden of flowers. Bot. of $\frac{1}{4}$ ounce Rs. 2/-, $\frac{1}{2}$ ounce Re. 1/-, V. P. & Packing extra.

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,

P.O. Box 2082, Juma Masjid, Bombay.

635 M. N. R., Tumkur.—Thread balling machines may be bought of Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta. For thread enquire of Sukdeo Ram Misra, 212, Cross Street, Calcutta and Shah Daraza Sewing Cotton Co., Hyderabad, Sind. There was a firm in Calcutta that dealt in knitting machines and used to take the articles manufactured regularly. But that firm has been dissolved.

636 B. N. B., Rangpur.—Prussian blue, indigo carmine, etc may be had of Hansraj Vishram, 13 David Joseph Lane and Annu Chand Mehra & Sons, 34 Armenian Street, both of Calcutta. For Turkey red oil enquire of B. K. Paul & Co, 1-3 Bonfields Lane, Calcutta.

637 M. S. C., Surat.—Carbon papers and ribbons may be supplied by G. Rogers & Co, Norton Bldg, Lall Bazar and Town Typewriter Co, 4 British Indian Street; both of Calcutta.

639 V. T. M., Narsiwaraapur.—For distul enquire of Scientific Supplies Co, 29-30 College Street Market, Calcutta and Scientific Instrument Co Ltd, Johnston Gunge Road, Allahabad.

640 D. R. M. R. C., Jullundur City.—For samples of American Nitrate Compuittee, Post Box 469, Calcutta. Gota may be had of Hirralal Chhaganlal, Chunilal Chiksy, P.O. Box 38 and P. N. Kinariwala & Co, Saiyadpura Vaw Street; both of Surat. Iron locks are in keen demand in large cities such as Calcutta, Bombay, Karachi, Madras, etc. However, you may enquire of the local manufacturers as to where they export their manufactures. You may remit the money through some banks that have branches in Germany and in U. S. A. Rs 2751

was equal to \$100 on the 18th. May last. As regards articles to be imported from other parts of India study the requirements of your locality very carefully when you will be able to ascertain the importable commodities yourself.

641 S. R. T. C., Berhampore.—For disposing of articles you deal in advertise in the pages of newspapers and periodicals as advertising is the only means of improving sales.

642 R. A., Delhi.—A good recipe of phenyle appeared in the last April issue. An article on glue manufacture will appear in an early issue.

644 D. C. G., Delhi.—A good formula of blue-black ink appeared in June 1923 issue. Formulas of red ink will be found in November 1922 issue.

645 S. A. T. C., Bezwada.—Lamps and mantles may be bought of Fani Bhushan Kundu, 85, Harrison Road, Calcutta; London Eastern & American Trading Co, Hunimam Street, Fort Bombay and Handhan Daw, 72-73 Old China Bazar Street, Calcutta. Furniture may be supplied by Adam Sajan & Co, 7 Bow Bazar Street and Chaudhury Burdhan & Co, 49, Bow Bazar Street; both of Calcutta. For toys enquire of Sheik Nazir Ali, 5 New Market, Calcutta, S. Babaji, 33 Cornwallis Street, Calcutta and Chicago Toy Works, Karachi.

646 B. B. D., Bombay.—To communicate with any party write him direct with name and initial under care of **Industry** when your letter will be duly rednected.

649 R. B. S., Chanda.—The scent emitted from sunlight soap is natural. It is produced by mixing the ingredients used. The colour is also a natural one. Vide No 626 above.

651 J. V., Trivandrum.—For exporting Malabar products you may correspond with the following produce brokers: Brown Arthur & Co, 126 Bishops Gate, London E. C. 2; The Produce Brokers Co Ltd, 24-28 St Mary Axe, London E. C. 3, Marquis Clayton & Co. Ltd., 14 Chapel Street, Liverpool and Walsh & Co, 16 East Cheap, London E. C. 3.

652 K. S. M., Shimoga.—Essential oil denotes liquid extracts derived from Vegetable

SETT DEY & Co

**ORIGINAL HOMEO PHARMACISTS,
42 Strand Road, Calcutta.**

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations
Catalogue Free On Application.

produce excepting oil containing seeds Otto is a term applied to the oily aromas from flowers, essential or volatile oil of roses Otto of sandal is not strictly a correct term, it should be oil of sandal Sandal wood oil is used for perfumery, medicine and manufacture of soap Essential oils are used for perfumery and medicine while ottos are used for perfumery only.

653 T D M, Utara—You may go through English-Urdu Chemical Glossary by Mr Gianchand Hotchand, Bharia, Sind

654 N S Benares—Four annas postage stamp is required for replies of queries by post

655 S B, Bikaner—Following are some of the stationers as required by you Haji Abdul Majid Mahammad Ian & Sons, 405 Canning Street, Biswanath Agency, 56 Canning Street; Mohamed Ismail & Sons, 587 Canning Street; Abdul Khaliq & Co, 1 Kalutola Street; D M Khan & Sons, 5 Kalutola Street and Jewan Buksh & Co, 7 Kalutola Street, all of Calcutta Chemicals may be bought of B K Paul & Co, 1-3 Bonfields Lane, Calcutta As regards size of phials use your own discretion Try to use phials as decent as you can The address referred to by you is your own

656 J C B, Surin—For address of the joint stock company enquire of Registrar, Jointstock Companies, Government Place, Calcutta There is an arrangement for training in dyeing at Bengal Engineering College, Shibpur For further particulars write direct to the Principal of the college You may go through The Dyeing of Textile Fabrics by J J Hummel to be had of Thacker Spink & Co, 3 Esplanade East, Calcutta

659 V. J. M., Bilmora.—Following are some of rice exporters. David Sassoon & Co, Forbes Street, Bombay; Hasan Premji, Freire Road, Carnac Bunder, Bombay, Sulaman & Coosun, 25 Amratolla Street, Calcutta and Hajee Ajum Goolam Hossen & Co, 12 Amratolla, Calcutta

660 S S P., Hyderabad—Knitting machines may be supplied by Harley Kay Ltd, Georgetown, Ontario; H Brinton Co, Philadelphia, Pennsylvania, U. S. A.; Hemphill Manufactur-

ing Co, Pawtucket, Rhode Island, U. S. A.; Bolssneck Erust, sullivanhof, Chemnitz, Germany; F Braner Reinhold, 82 Dresdenerstrasse; Chemnitz, Germany and I. L. Burridge & Co., 23 Humbarstone Road, Leicester, England.

663 K M M, P, Kyaiklat—For industrial books enquire of The Book Co, 4/4A, College Square, and Thacker Spink & Co, 3 Esplanade East, both of Calcutta

664 R Muttrah, 1 Hugh Low Street, Ipoh, Perak, F M S.—Following are some of the tanneries Indian Fanneries Ltd, Hide Road, Kidderpore, Calcutta, National Tannery Co Ltd, Pagladanga, Entally, Calcutta, Madras Leather Co Ltd, 9 & 10 Second Line Beach, Madras, Elysium Leather Works, 23 Angappa Naik Street, Madras and Chrome Leather Co, Chromepet, Palavaram, Madras

666 C M R, Devakottai—Corks may be supplied by P S Dutt & Sons, Ezra Street, Calcutta The machines required may be bought of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta

670 J N P, Sabour—Small cinema machines may be had of Calcutta Camera House, 158 Dharamtala Street and J F Madan & Co, 5 Dharamtala Street, both of Calcutta

671 C N S, Hooghly—For flux for enamelling enquire of B K Paul & Co, 1-3 Bonfields Lane, Calcutta

672 M K R, Cuttack—Vernacular equivalents of Cocculus Indicus appeared in the last



**Cheapest House For
SPORTING GOODS
Silver Medals, Cups &
Shields.**

**Fine Silver Medals in
Velvet lined cases.**

Rs. 3/12/- each.

**Largest Stock & Variety
Illustrated Lists Free.**

**CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

673 R R J., Rohtak.—A good recipe of white coconut oil soap appeared in January 1926 issue. In preparing soap with castor oil follow the same process.

675 M M., Myingyam.—It is not possible to learn eye testing by correspondence as it is a part of the medical science.

676 N L G., Bhubawal.—Paper for preparing slate pencils appeared in November 1923 issue.

678 I V B R G., Bobbili.—You may go through The Banana—Its Cultivation, Distribution and Commercial Uses by W. Fawcett to be had of The Book Co., 44A, College Square, Calcutta.

679 S I. C., Hafizabad.—There are various lines of business hence it is difficult for us to say which line will suit you best, if you can select a line which after your liking we shall be glad to point out the merits and demerits of the particular business. To extend your agency business approach each man individually and try to convince him of the advantages of insurance. The inventions referred to in Scientific Topics columns are in experimental stage when they will be in perfection they will be put in the market when you will be able to import them.

681 N P L., Rohu.—Tw means Twaddle hydrometer. First experiment with a small quantity and ascertain the capacity.

682 N P F., Mandasa.—Til oil may be bought of Anath Nath Dey, 4 Moidaputty, Para Bazar, Calcutta. Wants to be put in touch with dealers in best ghee, stick brooms, groundnut, etc.

683 S M A., Madura.—Printing types may be supplied by American Type Founders Co., Jersey City, New Jersey, Schoder & Lambard.

HIDDEN TREASURE

Right-Hand "Dakshinayan" Shankh. A Right-Hand Conch-Shell, 4" long, for Rupees Two Thousand Only. If you want to prosper daily in Wealth and Health obtain this RARELY procurable & un-valuable GENUINE article, in a month, or until unsold. Send ½ Money in Advance. Write with Stamp to—

T. NATH, SHUKLA,
MIYAGAM-KARJAN, (Baroda State.)
B. B. & C. I. Rly.

Stamp and Die Co., New York and Henry Mose & Co Inc., New York, all of U S A.

684 S N., Farukere.—For yarns try Dinshaw & Co., 16A, Apollo Street; R M Jassawala & Co., 3-13, Apollo Street and J David Sassoon & Co., 143 Esplanade Road, all of Bombay. For printing machines enquire of K Banerjee, 8 Canning Street, Calcutta.

686 S B C., Seoni.—Your query being in the nature of an advertisement should not be published in these columns.

687 N C D., Imphal.—Wants to buy cotton seed oil.

690 R V S V R., Tanuku.—Hints for small industries appear regularly in the pages of **Industry**. Refer to item No 67 in April issue.

691 C B P., Davangere.—For metal boxes, enquire of T E Thomson & Co., 9 Esplanade East, Calcutta. German dyes may be supplied by Aminchand Mehra & Sons, 34 Armenian Street and Hansraj Vishram, 13 David Joseph Lane, both of Calcutta. For crayon making appliances try Calcutta Industries Ltd, 136-37 Manicktala Main Road, Calcutta. Collapsible tubes may be supplied by Venesta Ltd, Great Tower Street, London E C 3 and Brooks Peel & Co Ltd, 24 City Road, London E C 1.

692 R C S., Sialkot City.—Process of manufacturing artificial slate appeared in April 1925 issue. Removing hair permanently is not possible.

693 M S., Cocanada.—Bronze powder is fine dust of bronze used in printing, carmine is red dye.

695 M O O., Paddhare.—An article on sheep farming appeared in March 1925 issue.

696 S P T., Jheria.—Two articles on rubber stamp making appeared in January and March 1924 issues of **Industry**.

698 R G H., Nasik.—You may have the dies manufactured locally by some engineering firms. You may try Calcutta Industries Ltd, 136-137 Manicktala Main Road and Bengal Small Industries Co., 91 Durga Charan Mitter Street; both of Calcutta. Following are some of the stationers: Nilmoney Halder & Sons, 106 Radha Bazar Street, Calcutta, Dass & Co., 60 Sikdar

Bagan Street, Calcutta, Bombay Stationery Mart, Victoria Bldgs, Parsee Bazar Street, Bombay and K. Ramrao & Co., 14 Humnum Street, Bombay.

699 H. S., Bhatkal—A good recipe of bar soap appeared in November 1925 issue

700 K. B. T., Ajmer—Recipes of biscuits appeared in February 1925 issue

701 T. A. R. S., Vaniyambadi—An article on removing stains from leather appeared in the last issue. Wants to know full addresses of The Hide and Leather and The Tanners and Curers

702 P. N., Bargarh—Try to secure Derby tickets through some member of Royal Calcutta Turf Club; 13 Russel Street, Calcutta

704 K. V. N., Baroda.—Following are the full addresses of the firms required by you. General Electric Co. Ltd., 14 Old Court House Street, Calcutta; Siemens Bros. & Co. Ltd., P.O. Box 224, Calcutta, and Henley's Telegraph Works Co. Ltd., Henley House, Calcutta. Engineering outfits may be bought of Martin & Co., Clive Street and Burn & Co., Hongkong House, Council House Street, both of Calcutta.

705 D. D., Tando-Adan—Please go through the New Idea Prize Competition Notice that appeared in March, 1926 issue. To communicate with querists write them direct with number and initials under care of **Industry**, when your letters will be duly redirected to them. You may correspond with the following service securing agencies: Bharat Service Securing Co., Agra and Kapoor & Co., Fatehpuri Road, Delhi.

706 H. P., Ranikhet.—For fibre extracting machines please try Oriental Machinery Supply Agency Ltd, 20/1, Lal Bazar Street, Calcutta

707 J. S. J. N. S., Jharia.—As you are new in the line it will not be advisable for you to export rice direct you should arrange with some rice exporters of Calcutta, names of which appear below; Harilal K. Lathia & Co, Amratola Street; Sulaiman Cassim, 25, Amratola Street and Shaw Wallace & Co, 4, Bankshall Street.

712 K. B. A., Ballar.—Pencil making and nib manufacture are done by mechanical process which requires machinery and some allied knowledge for working machines. Nib making

machines may be supplied by Bengal Small Industries Co, 91, Durgacharan Mitter Street, Calcutta. For pencil making machines write to Oriental Machinery Supply Agency Ltd, 20/1, Lal Bazar Street, Calcutta. The above firms will give instruction for working machines. Gum arabic may be bought of Banshidhar Dutt & Sons 126, Khengraputty, Bara Bazar, Calcutta. Wants to buy thread for thread ball making

713 K. M. M. W., Karachi—Sand is generally found in sea shores and riverbeds.

714 O. B. B., Lahore—Recipes of face cream appeared in July 1924 and September 1924 issues of **Industry**. Wants an expert in preparing face cream.

716 M. L. S., Nasirabad—Yes, you may start an agency business in Rajputana. Before starting an advertising agency ascertain how much local advertisement you can secure. Then calculate the establishment expenses and commission money expected. If you find that the business is paying you may start it. There is no journal like "**Industry**" and "**Commercial India**" can supply margo seed, dhatura and tamarind

717 K. J. C., Bombay—Carpets are manufactured by Girdhar Lal Beniprasad, South Gate Street; Din Mohammad & Peer Mohammad, Bhadohi and Ram Lal Ramvilas, Madhoram Road; all of Mirzapore.

719 B. L. M., Satara.—Small trades and recipes and formulas appear regularly in the columns of "**Industry**." There is no separate book on the subjects.

720 F. G. M., Cawnpore.—Wants to be put in touch with dealers in lizard and crocodile

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College
USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers
Factory—Baranagar and Barisal,
Office—113, 114, Khengrapotty St., Calcutta.

skins. Requires address of the Indian agent of Kaufmann knives.

721 D. R. V. P. S., Moga.—For confectionery machines enquire of Seth Deepchand, Sukkur, Sindh.

724 H. Y. S., Bangalore.—Agarbatties may be had of S. A. Azim Allabux, 57, Lower Chitpur Road, Calcutta.

726 M. B., Nagpur.—Try to manufacture soap yourself according to the recipes and formulas published in "Industry."

727 J. S. S., Fatehgarh.—Mustard oil cannot be decolorised.

732 S. C. S., Hindupur.—Fountain pens are manufactured by F. N. Gupta & Co, 12, Belliaghata Road, Calcutta; L. E. Waterman & Co, Pen Corner, 41, Kingsway London W. C. 2; Mable Todd & Co Ltd, 133 & 135, Oxford Street London W. 1; Crocker Pen Co, 167, Oliver Street, Boston, Massachusetts, U. S. A., Modern Pen Co, 170, Broadway, New York, U. S. A.; Karl Kracker, 9, Antiostrasse, Hamburg 25, Germany and S. Fukni & Co, Hiranonachi, Osaka, Japan.

733 A. S. R. C., Sorab.—Sandal wood curios may be supplied by Mysore Agency, 15, College Street, Calcutta. Ivory curios may be bought of Ghosh Dastidar & Co, 125, Bow Bazar Street and The Bengal Industrial Co, 5-7, Russa Road South; both of Calcutta.

735 P. N. S., Dunkal.—Particulars of the firm referred to by you is not known.

737 A. P., Delhi.—Recipes of disinfectant fluid appeared in April 1926 issue. Glass phials may be supplied by S. K. Dey, 124, Shova Bazar Street, Calcutta. Recipes of insect poisons appeared in the last issue.

738 D. D., Dacca.—Recipes of soap solution and shaving powder will appear in an early issue. You have to prepare different

kinds of cements for different metals. Renovating of gramophone records is not possible.

740 S. C., Agra.—Wants a large supply of old newspapers.

741 M. P. K., Baroda.—For syrup making you may go through Syrup Manufacture published from this Office.

743 K. C. S., Rajkot.—Process of manufacturing jeweller's rouge appeared in January 1922 issue.

744 N. S., Benares.—Refer to No. 654 above.

745 S. A. A., Gaya.—Addresses of periodicals appeared several times in these columns. However you may consult the following journals—Indian & Eastern Druggists 49-50, Watling Street, London E. C. 4; Amateur Trader, Pub-Miss C. Milland, Teddington Middlesex, England, American Journal of Sciences, Pub-A. F. Bird 22, Bedford Street, Strand, London W. C. 2; Bioscope, 85, Shaftesbury Avenue, London W. 1, British Builder, Pub-Messrs E. J. Parsons Ltd, 415-418, Bank Chambers, 329, High Holborn London W. C. 1. and Electricity, 36, Maiden Lane, Strand, London W. C. 2.

746 M. D., Trichinopoly.—Seeds may be bought of Royal Gardening Association 6B, Tagore Castle Street, and Sutton & Co, Park Street, both of Calcutta. Wants to be introduced to dealers in secondhand books.

747 N. P. P., Alleppey.—Process of preparing glycerine appeared in March 1925 issue. Recipes of soap like sunlight soap appeared in August 1921 issue. A formula of bar soap appeared in November 1925 issue. Sal soda may be bought of B. K. Paul & Co, 1-3 Bonfields Lane, Calcutta. Sweet oils may be had of Anath Nath De, 4, Moidaputty, Bara Bazar, Calcutta. Olive oil may be supplied by B. K. Paul & Co, 1-3, Bonfields Lane, Calcutta. Tallow may be supplied by Calcutta Tallow Mart, 19, Tirettra Bazar, Calcutta.

748 T. K. S., Arumbakkam.—Wants to know Tamil equivalent of the bird "Dhane chiral"—a sort of black bird with long red tail also called 'Mobakar'.

ESSENCES, & ESSENTIAL OILS,

Perfumes, Chemicals & Sundries, etc.

Everything you need for Manufacturing, Hair Oils, Scents, Ottos, Soaps, Perfumed-Waters, Syrups, Udbathis (Scented-Sticks) Zarda Tobacco, Snuffs, Pomades, Hair-Botions and Perfumery preparations in general; can be had of us at very competent rates. Pricelist free. Apply to:—

D. G. GORE,

31, Mangaldas Road, Market, Bombay No. 2.

749 K C C, Nagaram.—Sporting goods are largely manufactured at Sialkot in the Punjab. The following are some of sporting goods manufacturers. S N Bhattacherya, 5, Dharamtala Street, Calcutta; (ari & Mahalanobis, 31), Chowringhee, Calcutta; Civil and Military Sports Works, Sialkot City; Royal Sport Works Green Wood Street, Sialkot City and Suraj Sports Works, Sialkot City.

750 S M B, Lahore.—For the address of the agent of the firm write to the Consul-General for France, Wadehouse Rd, Colaba, Bombay.

751 B M B, Bhilwara.—You may consult a manual on tailoring to be had of Chackraverty, Chatterjee & Co, Ltd, 45, College Square, Calcutta. Process of manufacturing slate pencils appeared in November 1925 issue. If you proceed according to the direction given the defects will be remedied. No machine is required for slate pencil manufacturing. Whitish layer on soap is due to the excess of alkalies in the lye. To neutralise use more fat or oil. Soap chemicals may be had of The Eastern Chemical Co, Ltd, 15, Dougall Road, Ballard Estate, Bombay. Wants to buy mowha oil and cotton seed oil.

753 B N B, Vellore.—There is no such recipe known to us.

755 N R K I, Salem.—You may send your name to Thacker Spink & Co, 3, Esplanade East, Calcutta for inserting your name in their directory "Commercial India" as published at 22, Sham Bazar Bridge Road, Calcutta. You may correspond with The Buist Spinning Co, Ltd, Stolewell Works, Dundee and M & C Hill Ltd, West Dudhope Mill, Dundee enquiring whether they would take plantain fibre. To communicate with any querist write him with number and initials under care of "Industry" when your letter will be duly redirected.

756 K R V, Mandi State.—For small cinema machines enquire of J F Madan & Co, Ltd, 5, Dharamtala Street and Calcutta Camera House, 158, Dharmatala Street; both of Calcutta.

757 N. L. G., Bhusawal.—Process of manufacturing slate pencils appeared in November

1925 issue of "Industry." Refer to No. 676 above.

758 S B S, Bijapur.—For subscription rate of the journal write direct to the advertiser.

759 A C M, Lyallpur.—Cycles and their accessories may be supplied by Aberdale Cycle Co, 61, Essex Road, London N 1; Raleigh Cycle Co, Ltd, 41, Holborn Viaduct, London E C 1; German Louis G m b H, Felderstrasse 27, Leipzig, Germany, Excelsior Cycle Co, Michigan City, Indiana, U S A, National Cycle & Manufacturing Co, Bay City, Michigan, U S A and Perlman Cycle & Auto Supply Co, 34, Warren Street, New York, U S A.

760 H S, Bahraich.—Recipes of hair dyes appeared in January 1925 issue.

761 R S M S, Jaipur.—Electrical goods may be bought of B M Singh & Son, 150, Lower Chitpuri Road, Calcutta.

762 K B, Roorkee.—Chemicals required may be had of B K Paul & Co, 1, Bonfields Lane, Calcutta. Cyclotyle ink and paper may be supplied by Bengal Miscellany Ltd, 99, Manicktala Main Road and Nihoney Halder & Co, 100, Radha Bazar Street, both of Calcutta. For particulars of contract write direct to the Superintendent, Printing, Stationery and Stamp, Church Lane, Calcutta. Formulas you require appear in this issue.

763 M F, Guntur.—It is advisable for you to advertise in newspapers and periodicals for speedy sale of manufactured loose tobacco.

766 K S N, Madras.—Formulas for hair

THE ONLY TIME TO ENCOURAGE.

SWADESHI INDUSTRY.

Purchase

KIRLOSKAR PUMPS.

Write for full particulars to Sole Agents—for India, Ceylon, etc

K. B. JOSHI & CO.,

321, Hornby Road, Fort, Bombay,

Post Box No. 534.

Calcutta—84A, Clive St.,

Post Box No. 675.

Karachi—Bunder Road,

Post Box No. 230.

Madras—Post Box No. 1260.

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices.



dyes appeared in January 1925, and for Phenyle appeared in April 1926 issue. The vegetable products offered as substitutes for ghee are made by a costly and elaborate process known as hydrogenation of oil. You may consult the following books on dyeing—(1) The Dyeing of Cotton Fabrics, By F. Becch (2) A Manual of Dyeing, By Ninccht, Rawson and howewenthal. What do you mean by "adhesive plaster"? Vermicelli is prepared from a stiff paste made of a peculiar kind of granular wheat flour called "semoule". For the process of preparation you are referred to January 1921 issue of **Industry**. Asafoetida is adulterated by a kind of red clay (tawah), by wheat or barley flour, and by powdered gypsum. It is also mixed with slices of the root.

767 A N M G, Masulipatam.—For the dictionary required enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta.

768 T N R, Ratam.—An oil of an amber colour is prepared from tamarind seeds by expression. The seeds boiled or fried after removal of the outer skin are also eaten by villagers, especially in times of scarcity. A cement or paste is made from the seeds which is used in dressing country-made blankets.

769 R L, Lansdowne.—Boot polishes of various brands are imported by Chandra Bros, Bentinck Street, Calcutta. Brasso metal polish may be bought of Angus Keith & Co, 98½, Clive Street and Kailash Chandra Dutt & Sons, 20, Bagnfields Lane, both of Calcutta. Locks may be supplied by Dinshaw Mehta & Co, 11, Hare Street, Calcutta and Clubb & Son's Lock & Safe Co, Ltd, 8, Hummum Street, Bombay. Other addresses will be found in the advertising pages of **Industry**.

WANTED

ENERGETIC AND RELIABLE AGENTS

to canvass orders for our famous Imperial Seamless quilts, pillow & Cushion cases, various patterns of bedsheets, towels and handkerchiefs, Hundreds of patterns checks, shirtings, art silk and mercerised saris Angavastrams, etc., etc. Write for particulars to:—**The Manager,**

IMPERIAL WEAVING ESTD.,

Kuppam, S. India.

770 G N P W, Ganjam.—Bleached yarn is most suitable for dyeing. The book mentioned by you is a code book which is used in sending telegrams in brief to minimise the cost. Textile machineries may be supplied by H. M. Meta, 123, Esplanade Road, Fort, Bombay.

772 B R., Nagina.—For oil extracting hand machines write to T. E. Thomson & Co, 9, Esplanade East, Calcutta. For ice making machines try Burn & Co, Hongkong House, Council House Street, Calcutta. For butter making and flour making machines enquire of Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta.

773 C. C. D., Nadiad.—A good recipe of odourless depilatory appeared in June 1924 issue.

774 S S T, Fatehgarh.—Any kind of starch will serve your purpose. For colouring hair oils you may use oil soluble aniline dyes and alkanet roots. Recipes of different kinds of ointments, will be found in September 1924 issue. Cologne water is used as a toilet requisite and in headache. Infant's cordial is a kind of tonic for children. For industrial books enquire of The Book Co, 44A, College Square, Calcutta.

775 F B, Secunderabad.—Confectionery making machines may be supplied by Seth Deep Chand, Old Sukkur, Sind.

776 J H G, Hubli.—There is no institute for learning tea industry. You may however go through January 1926 issue of **Commercial India** where you will find an exhaustive article on tea industry.

777 M P, Agra.—For moulds enquire of S. A. Manan, 113, Machua Bazar Street, Calcutta.

780 H N, Rangoon.—The following are some of opticians. Lawrence Mayo & Co Ltd, 16, Old Court House Street and Stephens & Co Ltd, 210, Bow Bazar Street, both of Calcutta.

781 M L B, Bundi.—We presume that there is some defect in saponification hence prepare the lye in such a way that perfect saponification takes place. For cheapening soap you may use soapstone as an adulterant, but not in

large quantity which will deteriorate the quality of the product obtained.

782 A. R. K., Montgomery—For the book required write to the advertiser direct Refer to No. 409 above.

783 S. W. K., Narayanpet—For books on different languages enquire of Messrs. Thacker Spink & Co, 3, Esplanade East, Calcutta

784 M R S, Ambala.—Bottles and phials may be bought of Satya Charan Paul & Co, 194, China Bazar Street, S. K. Dey, 124, Shova Bazar Street and C. K. Das & Sons, 17, College Street; all of Calcutta.

785 N L., Namital.—You may go through The Indian Boy, Scout Ashram, Meerut There is no journal devoted to fine arts in India You may however consult Drawing & Design, 34, Paternoster Row, London E. C. 4

786 S L. B., Peshawar Cantt.—Recipes of pyrotechnic matches are not known For match label printing try Calcutta Fine Art Cottage, 76, Dharmtala Street, Calcutta

787 K. S. S. B., Madura.—Wants article of Golkonda metal

788 V. G. A., Bhandara.—As regards your first query consult a physician. Yes you may use vaseline and mobil oil as motor lubricant

789 V. A. R. I., Paramakudi.—No essence is used in special varieties of tea. The odour is due to skill in blending Tin boxes of required description may be supplied by Hall & Sons, 1, Hannet Street, Minories London E. C. 3, Jahncke Ltd, Dorset Street, Essex Road, London No. 1 and North London Tin Ware Co Ltd, 5, Cornwall Street, London N 1 For brick and tile making machines enquire of Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta For installing a ginning machinery write to H. M. Mehta & Co 123, Esplanade Road, Fort, Bombay.

790 F. C., Bezwada.—Watches and clocks may be supplied by Jura Watch Co, Delemont, Jilga Watch Co, P. Join Bienne and Transmarine Watch Co, H. Buchser & Co, Soleure, all of Switzerland.

791 B. B. P. U., Dohad.—A good recipe of black ink will be found in June 1924 issue. Process of preparing "mukhbilas" appeared in

December 1925 issue. A formula of marking ink appeared in May 1924 issue. For books on signboard design write to Thacker Spink & Co, 3, Esplanade East, Calcutta. A good quality glass cement may be made by mixing some casein with sodium silicate.

793 K V, Bapatla.—Consult a mechanical engineer for constructing toy aeroplane.

794 K C., Nagarami.—For securing loans on security you may write to Gillanders Arbuthnot & Co, Gillander House, Clive Street, Calcutta.

795 M A V, Feroke.—We do not deal in any machines We only supply information to our constituents Envelope making machines may be bought of Oriental Machinery Supply Agency Ltd, 201, Lall Bazar, Calcutta

796 D R, Vizianagram.—For particulars of I C S Examination write to the Registrar, Calcutta University, Senate House, Calcutta.

797 N G., Hyderabad.—Kudraksha may be bought of Naren Chandra Roy, 27, Mukta Ram Babu Street, Calcutta.

798 R R B, Calcutta.—Blue and red dyes may be supplied by Amnchand Mehra & Sons, 34, Armenian Street and Hansraj Vishram, 13, David Joseph Lane, both of Calcutta.

799 K B, Poona City.—You may go through Rubber Hand Stamps and the Manipulation of Rubber by T O Conon-Sloone to be had of Thacker Spink & Co, 3, Esplanade East, Calcutta

801 B G B, Panna.—Yes, you may learn telegraphy in the school mentioned by you.

804 N P L., Rohri.—Further particulars regarding bleaching yarn will appear in an early issue

805 M L., Tanjore.—Process of depositing iridium point at the end of fountain-pen nib appeared in September 1922 issue

807 K. A W, Lahore.—For industrial books enquire of Thacker Spink & Co, 3, Esplanade

OVER 200 ORDERS (Regd.)

DR. TENELL'S ART OF

Homeopathic Prescribing. Medical men cannot do without this book. Family men can cure almost all diseases with its help. Ready 15th June. Order now. Re. 1/12/- post free.

DR. M. N. TENELL,
Zamindar, Agra.

East and The Book Co Ltd, 4/4A, College Square; both of Calcutta

813 G S, Knapat—For Anglo-Telegu dictionary and other literary books enquire of Andhra Publishing House P.O. Box 73; Sen Tamil Book Depot 13, Wyncyappa Naick Street, Park Town and Sollen & Co, 192-193, Triplicane High Road, all of Madras

816 M O O A, Padhari—An article on sheep rearing appeared in March 1925 issue

817 B. S N, Tinnevely—Gramophones may be bought of, K. C Dey & Sons, Gramophone Palace, Harrison Road, Calcutta

818 V. C W, Nizamabad—Enamelled brasswares may be supplied by K S Jawhar & Sons, Sidhi Thera Street and Saith Perthi Nath Singh, Kucha Mean Sahib, both of Moradabad Wants to be put in touch with importers of German silver ingot. White oils may be bought of Anath Nath Day, 3, Moidaputty, Bara Bazar, Calcutta Corks and capsules may be supplied by P S Dutt & Bros, 8, Ezra Street, Calcutta For label printing write to Calcutta Fine Art Cottage, 76, Dharantala Street, Calcutta. Wants to be introduced to cutlery dealers of Afghanistan

820 T N T S, Shikarpur.—Wants large quantity of plum.

821 K L V, Sitamau—Chemicals and laboratory requisites may be supplied by B K Paul & Co, 1, Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd, 15, College Sq, both of Calcutta.

822 S. M K, Sonpur—All the recipes of hair dye published in January 1925 issue are tested ones All the indigenous ingredients

CONTROL OVER BIRTH (Illustrated).

(English Edition. By Prof. H. S. Gambers.)

Containing 14 up-to-date Scientific methods for avoiding undesired conception has been acknowledged by eminent doctors to be the Standard book on Contraception. Parents wishing to limit their family will find it a god-send.

Price Annas Twelve Only. Postage Extra. • Post free to those who send 13 Annas Stamps

BRIJMOHAN & CO.,

Katra Nihal Singh, Amritsar.

used may be bought of Jadu Nath Ghar, Huka-putty, Bara Bazar, Calcutta. Black tea may be bought of Mukherjee Bros 17-19, R. G Kar Road and Bhattacharjee & Co, 1, Swallow Lane, both of Calcutta Process of preparing ammonia water appeared in December 1923 issue

823 M L C, Najibabad.—Homeopathic medicine and books may be bought of King & Co, 83, Harrison Road; C Ringer & Co, 4, Dalhousie Square, East; Berigny & Co, Mercantile Bldg, Lail Bazar and Lahiri & Co, 35, College Street, all of Calcutta

824 H I. G, Roorkee—Following are some of the sugar mills in India Assam Sugar Estates & Factories Ltd, Nalbari, Assam; Champaran Sugar Co Ltd, Bara Chakia, Champaran; New Savan Sugar & Gur Refining Co Ltd, Savan Samastipur Central Sugar Co. Ltd, 123/1, Halsey Road, Cawnpore, Poona Sugar Works & Rum Distillery Poona; Deccan Sugar & Abkari Co. Ltd, Parry's Bldg 1st Lane Beach, Madras and Cawnpore Sugar Works Ltd, 123/1, Halsey Road, Cawnpore

825 R P K, Dharwar—You may write to the Secretary, The Association for the Advancement of Scientific Studies of Indian Students in Foreign Countries, 10 Old Post Office Street, Calcutta for some help

826 F C B, Castle Rock—About cattle insurance consult an expert who will supply you with all details

831 D M M. P, Dindigul.—For seeds write to Agri-Horti Society, Alipore, Calcutta.

833 N R C R, Shimoga—For books on tailoring and scientific cutting enquire of Thacker Spink & Co. 3, Esplanade East, Calcutta.

834 V U, Ambajipeta—Your query being in the nature of an advertisement should not be published in these columns.

835 S M U S, Agra—Reply to your queries appeared in May issue under No. 491.

836 M F, Guntur.—For cigarette tobacco cutting machines enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

837 R N S, Kamaha.—Addresses of watch and cycle dealers appear elsewhere in this issue

838 J N C, Madras.—Process of preparing lime juice glycerine appeared in April 1926 issue

839 A D S C, Cochin.—If selecting scent for hair oil follow your own choice For tin boxes enquire of P Lodge & Co, Po Box 6772, and Rampratap Gajanand, 6 Halsibagan Road, both of Calcutta

840 U D S, Rajpur.—A good formula of washing soap appeared in January 1926 issue

841 K B Faizpur.—Process of preparing battery for electrical energy appeared in May 1923 issue Chemicals may be bought of B. K Paul & Co, 1 Bonfields Lane, Calcutta Wants to buy tobacco for preparing cigarettes

842 K R, Larkana.—For industrial books enquire of Thacker Spink & Co, 3 Esplanade East; The Book Co, 44A, College Square and Chakraverty Chatterjee & Co Ltd, 15 College Square; all of Calcutta

843 T N D, Cawnpore.—You may soak pads of cotton in the lac dye and sell them in the market as 'Alta' used by women for dyeing their feet

844 M B S C, Vizianagaram.—The chemicals you require may be had of B K Paul & Co, 1 Bonfields Lane, Calcutta

846 S B J, Pendra Road.—For increasing lather you may use rosin Your may consult soap manufacture by Wait to be had of Thacker Spink & Co, 3 Esplanade East, Calcutta

847 S H, Ajmer.—Typewriter machines may be supplied by Remington Typewriter Machine Co, Council House Street, Calcutta

848 J R R., Delhi.—Several recipes of insect poisons appeared in May 1926 issue Select one of them Your other query is outside our scope

849 C H R S, Porali.—Soap moulds may be had of Calcutta Industries Ltd, 136-37 Manicktala Main Road, Calcutta Requires mohua oil in large quantity.

850 P. N B C, Multan Cantt.—Tartar may be supplied by B. K. Paul & Co, 1 Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd, 15 College Square; both of Cal-

cutta A formula of rubber stamp ink appeared in July 1923 issue Wants to buy shell of acacia tree

852 M S P Hospet.—A formula for hair destroyer appeared in the April 1925 issue and for tooth powder in March 1925. For copying pencils please enquire of (1) Bader & Co, Hans, Singer StraÙe 14, (2) Johann Berthmann & Sohn of Nurnberg, Germany

854 M Ahmedabad.—You ought to advertise regularly that you are a dealer in printing materials

855 R C N Basti.—For matches in large quantities please write to Lal Chand Bros., Match Depot, 33A, Central Avenue, Calcutta, for produce to Jogindra Nath Das, 54, Canning Street, Calcutta, for umbrellas Mati Lal Paul, 125 Old China Bazar St., Calcutta

856 M I A Shadal.—A formula for printing photograph on handkerchief appeared in January 1924 An article on process block making appeared in February 1923

858 G B B Nagpur.—The tin cans for packing tea may be had of H M Dey & Co, Harinburi 1st Lane, Calcutta

861 N V Bezawada.—Your query has been replied to in the formula section of April issue.

862 T H B Sukkur.—World's Commercial Products by Freeman and Chandler may serve your purpose

863 G B Malda.—What particular recipe do you complain of?

864 D S B, Bharawas.—A C is alternating current as opposed to D C which means direct current

867 M D S, Tadpatrin.—The English equivalents of the Burmese vernaculars quoted by you are not known

868 S S Delhi.—Addresses of trade journals appear from time to time in these columns.

874 N B. D' Poona.—Homeopathic institutes at Calcutta are The Cornwallis Homeopathic School, 104 Cornwallis Street, Calcutta and The Calcutta School of Homeopathy, 265 Upper Circular Road, Calcutta.

872 L. C. Kondanoor.—Indian directory may be had of Thacker Spink & Co, 6 Mango Lane, Calcutta and London Directory from 25, Abchurch Lane, London, E. C. 4.

874 A. E. Akyab—A mixture of 2 drams boracic acid with 3 drams common salt, of which an addition of 2-3 dram to 1 gal of milk is said to increase its keeping qualities for twenty-four hours

875 B. K. Madras—Write direct to the Secretary, Association for the Advancement of Scientific Education in Foreign Countries, 10 Old Post Office Street, Calcutta

876 S. N. Amritsar—Wants addresses of fruit dealers in Great Britain and France

877 A. Bhagalpur—Fish oil may be had of H. A. Kasim 29, Zakariah Street, Calcutta

878 R. C. P. Benares—A formula of syrup powder appeared in January 1924. The particular Magnesia you mention is most probably a trade article. Hints on removing rancidity of oil appeared in June 1924

879 N. P. T. Wodha—Addresses of mesmerist and occultist are to be met with in the advertisement pages of *Industry*.

880 A. H. Jajum—All the formulas you require have appeared in one or other issues of Vol. 14.

883 M. H. Quetta—Wants to buy saccharine from a dealer in Madras

884 K. C. Banu—A formula for Lime Juice Glycerine appeared in last April issue

885 H. R. B. & S. Gorakhpur—The button making industry may be learnt by becoming an apprentice. You may consult Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta

886 M. T. M., Mingaladon—For combossing machines please enquire of P. N. Dass & Sons 122, Grand Trunk Road Salkia, Howrah, also of Rae & Co., 6/A, Madge Road, Calcutta

887 J. C. S., Diggi—The only authoritative treatise on the manufacture of Indian sweetmeat is Bengal Sweet by Mrs. J. Halder, to be had of Chuckervertty, Chatterjee & Co. Ltd, 15, College Square, Calcutta

888 C. L., Amritsar—Books on food preserving may be had of Chuckervertty Chatterjee & Co. Ltd, 15, College Sq. Calcutta.

890 H. G. B., Dacca—Buttons are generally made of horn, ivory, mother-of-pearl, celluloid, artificial ivory, nuts, wood, etc. A method for

dyeing mother-of-pearl appeared in December 1924. The following are the addresses of artificial silk dealers of Berlin, Germany.—(1) C. Gebr. Back, 19, Aite, Leipziger, Strasse 2 (2) C. A. Hvoemann, Ritter strasse 44

891 M. N. R., Tunkur.—The thread balling machines mentioned by you are serviceable. Threads may be had of The East & West Trading Co. 16, Bonfields Lane, Calcutta. Wants thread balling machines from Bombay. For books on confectionery write to Thacker Spink & Co. Esplanade, Calcutta. The profit on any industry depends on the price of raw material and finished product, competition, local demand, etc. You must study these factors and prepare an estimate yourself. A commission agency cannot be carried on without capital.

892 T. S., Ganjam Dt.—You can earn your living by dealing in local products. Also go through the articles on New Idea Suggestions and pick up one suited to your taste.

893 D. S. H., Delhi—Wishes to be introduced to the flour mill owner as a dealer in mill stores. Why don't you advertise in the pages of *Industry*?

900 N. P. W., Calcutta—All the technical books required by you may be had of Chuckervertty Chatterjee & Co. Ltd, 15, College Square, Calcutta. For the appliances try Calcutta Industries Ltd, 136/137, Manicktala Main Road, Calcutta

901, S. R., Cocanada—Ideas for pardanashin ladies appeared almost in every volume. You may consult those and ascertain which ideas will suit dies of your locality. As regards selling goods you may try to sell them on commission basis when sellers will be interested in selling your goods speedily.

902 K. L., Pulok West—For starting prospective industries you may go through September 1923 issue. For sugar and glass manufacture consult experts. Recipes of glass appeared in December 1925 issue.

905 B. B. B., Bogula—A Matriculated youngman having some knowledge in biochemistry wants a service in a tea garden. Your other enquiries are in the nature of an adver-

tisement hence these should not be published in these columns

906 S. A. Y. Gaya—An article on insect poison appeared in last May issue where you will find many recipes for destroying bed bugs. The following firms deal in shellac. M. M. Ispahani & Sons, 51, Ezra Street, Laljee Mohamed, 11-2, Sukeas Lane and Lyall Marshall & Co, 25, Mangoe Lane, all of Calcutta

907 C. V. Savalyapuram—Pollen of keora, nutmeg, rose petals, cloves, musk, liquorice powder, saffron, etc may be used for perfuming betel powder.

909 A. C. S. Lashkar—For vermicelli making machines write direct to the advertiser

909 K. M. K. Twante—Refer to No 588 above.

911 S. R. C. Knaori—Umbrella may be supplied by Imperial Umbrella Mart, 136 Abdul Rehman Street, Bombay; Bombay Umbrella Mart, 269 Hornby Road, Bombay, Jeetmal Mahelchand 2, Armenian Street, Calcutta, Mohendra Lal Dutt & Sons, 51-53 Harrison Road, Calcutta and Anil Coomar Dutt, 53, Harrison Road, Calcutta. Consult a physician

912 G. S. M. Udaypur—Recipes of hair lotion will be found in July 1924 issue. Recipes of bug killer and mosquito killer will be found in last May issue. There is no such institution known to us.

913 J. L. R. Kotagala—You are referred to a veterinary surgeon for expert advice

914 T. M. S. Mohad—You may go through Lac-Production, Manufacture and Trade By Mr. J. E. O'Connor to be had of Thacker Spink & Co, 3 Esplanade East, Calcutta. The following are some of lac factories in India, Arthoon's A. M. Shellac Factory, Jhalda, Manbhumi; Bengal Shellac Factory Ltd, Chakradharpur, B. N. Ry; India Lac Co, Nirshachati, Dhanbad; Shri Ram's Lac Factory, Pakur, Sonthal Parganas, and Luca's Lac Factory, Mirzapur City. For particulars of lac industry go through September 1923 issue of **Commercial India**, the sister journal to **Industry**.

916 L. J. P., Hyderabad—Needle making

machineries may be supplied by White Edward, Windsor Works, Redditch, England. For cutting cardboard in required shape use punching machines which may be supplied by Oriental Machinery Supply Agency Ltd, 201 Lal Bazar Street, Calcutta. Ready made thread to be used in thread ball may be supplied by Shah Daraza, Sewing Cotton Co, Hyderabad, Sind.

918 V. C. W. Nizamabad—White oil may be had of Anath Nath Dey, 3 Mondaputty, Bara Bazar, Calcutta. Scents used in hair oils may be supplied by Sickin & Co, 55 1/4, Canning Street, and B. K. Paul & Co, 1, Bonfields Lane; both of Calcutta. Colours may be had of Anunchand Mehra & Sons, 34, Armenian Street and Hansraj Vishram, 13, David Joseph Lane, both of Calcutta. Corks and capsules may be bought of P. S. Dutt and Bros, 8 Ezra Street, Calcutta. Bottles and phials may be had of S. K. Dey, 124, Shova Bazar Street and Satya Charan Paul & Co, 191, Old China Bazar Street, Calcutta. For label printing write to Calcutta Fine Art Cottage, 70, Dharamtala Street, Calcutta. Essence of vinegar may be bought of Smith Stanstreet & Co, Dalhousie Square, Calcutta. Process of preparing vinegar appeared in May 1925 issue.

921 P. F. G. Mudichal—Match making materials such as splints, veneers, etc may be supplied by Bhawan Engineering & Trading Co, 112 1/2, Upper Circular Road and Bengal Small Industries Co, 91, Durga Charan Mitter Street; both of Calcutta. Match making machines may also be supplied by the above firms.

922 P. V. R. Kottar—Recipes of jellies appeared in April 1922 issue. For speedy disposal of goods found abundantly in your locality advertise in the pages of newspapers and periodicals. Your other enquiry is receiving our attention.

925 Gurbachan Singh, Agent Oriental Carpet Manufacturers Ltd, Seistan, Persia.—Recipes of insect poisons will be found in May 1926 issue

Notices and Reviews.

Toilets.

Toilets of good quality are manufactured by Dr. Milki Ram & Sons, Sudder Bazar, Ambala.

Tooth Powder.

Mr N. R. Krishna Iyengar, Namakal, Salem, sends us sample of tooth powder prepared from indigenous drugs.

Ink Powder.

Ink powders of different qualities are made by Messrs. K Bros, Roorkee, U P. These yield nice fluid ink.

An Advertising Agency.

With a view to serve the commercial public of Madura, a great trade entrepot of South India, Prof G S Bhannah has started Bhannah's City Advertising Agency at 65, Krishna Row Tank Square, Madura.

Writing Ink.

We have received from Mr S Bardhan, 421, Baranoshi Ghose St, Central Avenue, Calcutta sample of S G R Bros' inks which we have found to be quite satisfactory. Our readers should use these swadeshi writing inks which are also cheap in price.

Journal on Medicine.

The Indian Medical Journal, Meerut City Editor Dr Kunj Behari Lal Varma.

This Journal, which enters the 20th year of its existence, needs no fresh introduction. It is the official organ of the All-India Medical Licentiate's Association and is primarily devoted to the dissemination and promotion of medical and sanitary knowledge. Beside items of topical interest the issue under notice contains some valuable original contributions.

Luminous Pictures.

The so-called 'radio-active' pictures shine in the dark after being placed in the light for a few minutes. These novelties are imported by The Eastern Trading Company, Shannuganathapuram P.O., Ramanad Dt., S. I.

A Useful Chemical.

We are extremely gratified to learn that sodium silicate of exceptional purity and satisfactory quality is manufactured by the Bombay Chemical Works, 7 Armentan Street, Calcutta with the help of formulas published in **Industry**. We strongly recommend this industrial chemical which may be safely used and substituted for foreign make.

A Journal on Printing.

The Indian Printer, 8, Canning Street, Calcutta.

We have just received the inaugural issue of this pioneer journal of India for printing and allied industries. The printing industry has a prosperous time ahead of it but the demand will be for quality printing. The articles, hints, suggestions, etc. contained in this journal all tend to educate the Indian printers for the improvement of the printing trade. No progressive printer should therefore miss it.

Journal on Naturopathy.

"The Nature Healer" Editor Mr R C Chatterjee, B L Office 20-A, Kaliprosad Chakrabarty Street, Baghbazar, Calcutta. Annual subscription Rs. 3 only.

The second issue of this very interesting journal just to hand, keeps in the wake of the inaugural issue. To give an idea of the wealth of lore to be met with in it suffice it to mention some of the articles. The Use and Efficacy of Cold Water; Explanation of the Water Cure, Prevention of Age Degeneration; Naturism, On Fruits, Pox and Honey and so on. Needless to point out that all these contributions are eminently practical and instructive.

Trade Enquiries.

[To communicate with any party write him direct with name and address as given below, mentioning **Industry**.]

718 Y Benode Behari Singh, Lakhimpur, Sibapur, Cachar--Can supply all sorts of Manipuri goods

722 Dina Nath Mahajan, Dada Siha, Thangra, Punjab--Require Bombay arrow-root in large quantities

729 Sudhir Bros, 138 Misser Pokhna, Benares City--Want to be put in touch with dealers in betel leaves and date sugar

731 The Eastern Small Industries, Laxmi Bazar, Dacca--Require Indian nuts used for manufacturing buttons

736 F C Nath, 50 Sita Ram Ghose St, Calcutta--Wants a capitalist partner with at least Rs 300 for running a lucrative thread ball making business

764 B D'Silva, Kayadi, Konoor, Kankanady, S Kanara--Can supply raw cashew nut dholls

778 Raj Bahadur Tewari, Chintamani St, Farrukhabad--Desires to buy gum tragacanth in very large quantity

800 Champaklal C Shah, Wadiwan City, Kathiawar--Desires to be put in touch with suppliers of oil seeds and oils (used in soap industry)

832 A. K. Bose, Santipur, Nadia--Desires to be employed in a match or soap factory as an expert

895 De Bros & Co, 71-3A, Shampukun Street, Calcutta--Want to be introduced to suppliers of lizard and fox skin

897 Mohanlal M Jhaveri Co, The Petlad Turkey Red Dye Works, Petlad Via Anand--Wants an expert in softening hard water

910 Thachil Varkey, Angamali--Wants to be put in touch with dealers in bamboo mats or reed mats

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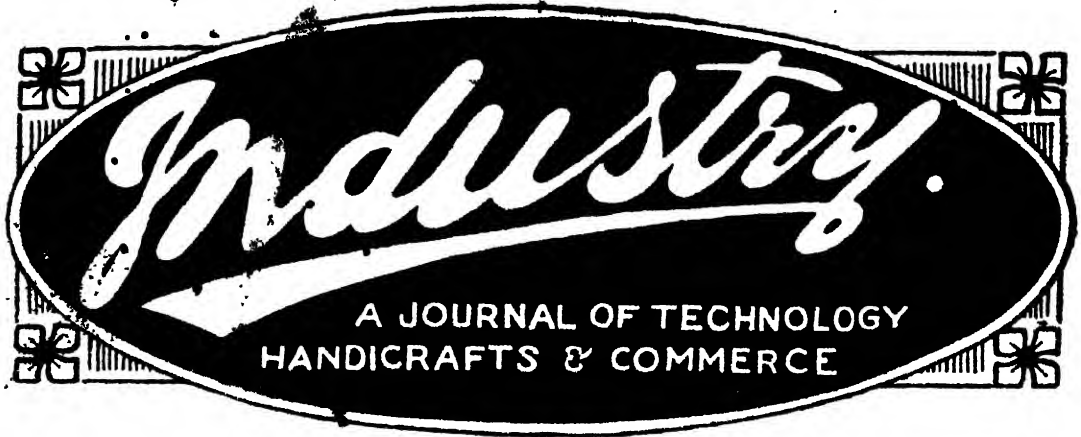
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FOR THE SAKE OF INDIAN CATTLE.

IN the dawn of human civilisation when there was no coin or currency, national wealth was reckoned, among other things, in terms of cattle. The Aryans who settled in India boasted of their "Gোধान," i.e., "Cattle wealth." So much was mankind indebted to cattle that they came to be looked upon with reverence; so much actually is their every-day usefulness that they are worshipped by the Hindus as "mother cow." But, sad to relate, they have deteriorated and degenerated in this country to an alarming extent owing to apathy and neglect of latter days.

It will be apparent to the common intelligence that the cattle problem is vitally related to the welfare of the nation. For instance, if we are to go ahead in agriculture we have to improve the quality of the bullock and the buffalo as they are the only motive power known to the Indian agriculturist. They plough

the field, ply the harrow, draw water from well for irrigation and do such other jobs. In agricultural industries they work the rice-huller and the oil-press. They furnish nutrition to the soil in the form of farm-yard manure which is very valuable. The utility of draught cattle is keenly felt in the interior where they are the only means of transport; they draw cart, carry loads and the like.

The dairy industry is in a very bad state whether in large cities or small towns. Its improvement is a crying necessity. Pure fresh milk in abundant quantity is a desideratum having an important bearing on the health of the nation. If the dairy industry is to be improved better cows have to be brought up.

Thus the problem is closely connected with village reorganisation. Here is also a vast field for the application of

co-operative principles. Co-operative dairy farms may be started everywhere with profit and the villagers can thereby add considerably to their meagre income.

The cattle problem will go a long way in solving unemployment, as a great number of youngmen will find occupation in cattle-breeding, dairy-farming, and the like.

The factors affecting the improvement of cattle are chiefly, supply of healthy bulls, introduction of new breeds, grazing ground, fodder-growing, healthy surrounding, etc. Veterinary education, of a sound and practical nature, is required to carry on scientific breeding and to save cattle from epidemic and other diseases.

No good purpose will be served by shallow sentimentalism about the sanctity of the bovine species. If we are really concerned about the welfare and improvement of Indian cattle we cannot do better than take a leaf out of the cattle policy of the Western nations. In spite of the fact that they are staunch "beef-eaters" look how they care for their cattle; look at the plump and healthy cows lodged in clean, sanitary sheds—at once the envy and admiration of the Indian cultivator and dairy man. Much solid and earnest work has to be done before we can expect to bring our cattle to the same level.

INDIAN SHEEP.

THE sheep belong to the family Bovidae—sub-family, Caprinæ—genus, Ovis—the specific scientific name being Ovis Aries.

Character—Horns in both sexes, large, angular, heavily wrinkled, turned downwards almost into a circle, with their flat points directed forwards and outwards. No muffle; no beard; chaffron convex; large but immobile eye, pits in some, wanting in others; small feet—pits in all feet; inguinal glands distinct; two mammae.

The common sheep is subject to great variety like most of our domestic animals, but all merging in to one known to the naturalist as Ovis Aries; and the wild sheep is said to be met with still in parts of Upper India and Europe. Sheep differ greatly in their form, size, coating or covering, and weight, in the different parts of India, these depending entirely on the climate, soil, and pasture-producing powers of the localities in which they are bred. The peculiar conformation of the mouth of the sheep, the lips being protected by hair, and the upper lip presenting a cleft, enables it to take a good close bite, much closer to the ground than cattle in general; and, for this reason, the sheep can thrive even on scanty pasture. The sheep is too well known to need any particular description, as a whole.



THE CATTLE PROBLEM OF INDIA.

THE cattle of India form one of the Bovinae genus Bovidae, Order Ruminantia. The genus Bovidae is divisible into three groups. 1, Bisontine or Bison; 2, Taurine or Ox group; and 3, Bubaline or Buffalo. Of these three groups, The Taurine, comprising the Ox or Bull, is most important to man as, during life, it contributes most materially to his wants and when dead, every part of every individual in it may be converted to his use. The Indian ox is termed scientifically *Bos Indicus* or Indian Zebu, popularly the Brahmin Bull, and comprises several varieties, all of which are remarkable for having long pendulous ears and a fatty elevated hump on their withers and are generally held sacred by the Hindus. Cattle in India comprise, in most districts, the wealth of the agriculturist or ryot, and perform most of his agricultural operations either with the plough or in carts, or as beasts of burden to convey produce from one

district to another. They furnish him also with animal food in the shape of milk and ghee, and the hide is made into leather thongs and water buckets. The Indian ox is still met with wild in some parts of Southern India.

Indian cattle, like those of Europe, vary in most districts either as to size, form and symmetry; or as to the growth and length of their horns, according to the varying local peculiarities of climate, soil and fodder, natural or artificial, all of which tend to influence the form, size and character of the animal.

The agriculturist, who lives on a meal of rice and perhaps a few herbs to season the same with, expects that his cattle will in like manner, pick up what they can in the way of pasture about the village or its adjacent lands, so that he never troubles himself to grow green food or prepare dry fodder for them; the same plant that supplies him with grain, feeds his cattle also with its straw. In

most towns and villages cattle are driven out at all seasons to graze abroad, but they more frequently lick the dust only and return home with their stomach as empty as when they started, to receive perhaps a few handfuls of straw or kitchen refuse, just sufficient to sustain life.

DIFFERENT TYPES.

The finest cattle in India are bred in Northern Gujrat in tracts of good grass land which extend round the Rann of Cutch and northwards into Rajputana. The deep alluvial loamy soils of this tract are very suitable for rearing young stock; the arable fields are quite as fertile as any part of India; pulse crops are extensively cultivated, producing excellent fodder which is available when the grazing gets bare.

In the north of India the pressure of population entails the occupation of almost all cultivable land. The absence of rich grazing ground there makes breeding operations almost impossible, except in a few localities.

THE AMRIT MAHAL BREED.

The characteristics of the pure breeds can only be very briefly sketched. Mysore has a far famed breed of cattle, which is characteristically different from every other Indian variety. The purest strain is the Amrit Mahal which stands in relation to other Indian breeds much as the thorough bred horse to horses generally. These cattle are of medium size and white or grey in colour. They are fiery tempered, and very active, enduring and hardy. The bullocks are essentially suitable for road work, and are capable of quick, long journey under a light or moderate load. They have fine heads, alert ears, and long pointed horns, while the compactly proportioned frame, the shapely limbs and the hard black feet indicate endurance, activity, and strength. This breed matures very slowly and the cows are poor milkers.

NELLORE AND ARVI CATTLE.

Nellore cattle are bred chiefly in and near the Madras Districts of that name. They are large, and usually white or grey



Fig. 1. Awankari and Ayrshire Montgomery.



Fig. 2. Scindi Bull.

in colour. They vary in type, indicating mixed breeding within recent time, and are of common origin with the Kistna valley cattle of Bombay. Many of the cows milk well. Many medium sized bullocks are used for cart and field work, particularly in the northern District of Madras. The Arvi cattle, the largest and best in the Central Provinces, are of the same size, colour and type as those of Nellore, though the cows do not milk so well. The bullocks are strong, but not active.

MALWI AND KHERI CATTLE.

The white or grey Malwi breed is common throughout Central India. The animals are particularly true to type, the head and horns being specially characteristic, and they have been bred pure for a long period. Large droves of young bullocks are driven annually into the Deccan for sale, and are in keen demand by well-to-do cultivators. They are spirited, active, and strong and equally adapted for plough, cart, or well-work. A pure Malwi bullock is very shapely, the body being wide and deep but not long, the limbs well set, and the feet hard

and round. The cows are poor milkers. The Kheri cattle of the United Provinces closely resemble Malwi.

GIR CATTLE.

A breed noted for its milk is reared extensively in herds in the Gir hills and forest in the south of Kathiawar. Pure Gir cattle are remarkably true to type, and in several respects characteristically differ from other Indian varieties. Two colours, or two shades of colour, the one blending into the other in a curious way, are common. An extraordinary development of frontal bone gives the forehead a very prominent rounded appearance, and the ears droop as in a lop-eared rabbit, those of a calf reaching to the nostrils. These cattle are fairly well proportioned and of medium size. The cow breed irregularly and when stall fed often get irritable in temper and may therefore soon go dry. Bulls and bullocks are alike used for work but they are slow and when old get very lazy.

GUJRATI CATTLE.

The Gujrat cattle are the finest breed, for general agricultural purposes, in India. The best are known as Kankreji



Fig. 3. Scindi Cow.

or Wadial cattle. They are white, silver, grey, or grey, dark grey in colour. The head is carried high and the spiral horns which are massive in old bullocks, give a bold, attractive appearance. Gujrati cattle are both active and strong.

HANSI CATTLE.

The Hansi or Hariana breed, the best specimen of which are not unlike Gujrati, consists of large white and grey cattle, bred in the Eastern Punjab. The breed is less noted now than in former days, but still yields good cattle.

The large Government cattle farm at Hissar breeds bulls for distribution among cultivators and supplies the Commissariat with heavy transport bullocks. Many of the cows are exceptionally good milkers, and have for this reason been taken in large numbers to other parts of India, the home area thus losing its best cattle.

The breed will in time regain its old reputation, owing to the distribution of selected bulls, and the keen demand for good bullocks in the new irrigation colonies of the Punjab.

LOWER SIND CATTLE.

The cows of the lower Sind breed are



Fig. 4. Hansi Cow.

generally good milkers. They are owned by Muhammedans, who do not usually cultivate lands, and move their cattle from one jungle pasture to another as occasion requires. The cattle vary a good deal in colour and appearance: the majority are a deep red, with occasional white markings. The best cattle are of medium size. The milking capacity of the cows has been improved, because the best bull calves of the most efficient milking cows are invariably selected as sires.

MONTGOMERY CATTLE.

The Montgomery cattle in the Punjab rival those of Hansi as a useful milk breed. They are small, shapely and short-legged, with fine heads, short horns, thin necks, fine leg bones, small feet, and exceptionally long thin tails. The colours vary, but most are dark red, pure white or grey; spotted cattle are, however, common.

BENGAL CATTLE.

The cattle in the deltaic areas of Bengal are very inferior. Even in Bihar and other areas of moderate rain fall they are not good although the soil is rich and excellent crops are grown. In the adjacent parts of Bengal the rural population is very congested and the average holding is small. Individual owners can thus keep few cattle, and no attention is paid to systematic breeding. Bihar is overrun with *pols* (bulls dedicated to the gods). These are very fat, and comparatively useless for stock purposes, but do much harm by eating and trampling the growing crops.

CATTLE OF U. P.

The cattle met with in the United Provinces of Agra and Oudh present

many types and characters, which appear to vary according to the tract or locality in which they are bred, and although they all belong to one species viz., the humped cattle commonly known as the *Bos Indicus* or Zebu, a wide difference in size, shape, temperament and character is noticeable. Thus we find in the North-Western districts a large breed of animal somewhat similar to the Hariana breed of the Punjab, whilst in Bundelkhand a sturdy breed of diminutive stature is met with. Certain districts are more or less justly noted for the quality of the cattle they produce, and to which they lend their name. Amongst these, may be quoted the Kosi Kheri breeds, but generally speaking there are very few varieties which are sufficiently true to any distinct type to justify their classification as a separate and distinct breed.

The most important of these are the so-called Kosi or Mewat, the Kheri, Panwar, (Pilibhit) and Kenwaria varieties and amongst these are to be found some very excellent strains of cattle, which are held in great repute, and for which there is a constant demand not only to supply the needs of their own localities, but for other tracts which are less favoured than themselves in their breeds of cattle. The Hill cattle (Pahari) are found at various altitudes all along the Himalayan range and present generally similar characters to those in the hill tracts of the Punjab and Bengal, whilst the cattle which are not classed in any particular breed are said to be *Desi*, meaning the ordinary country or local production.

It may be stated that whatever Amritsar District may have been in the

past it is no longer a cattle-breeding district in the broad acceptance of the term neither does it produce any special breed. At one time the Manjha was celebrated for superior cattle specially in the more pastoral parts of the Lahore District. But since the tract has come under flow irrigation there has been insufficient grazing and the cattle have become mainly stall-fed.

BURMESE CATTLE.

The cattle of Burma are of a purely indigenous character and form a type peculiar to that province and the neighbouring Shan States. The Burmese ox stands from 46 to 50 inches high behind the hump. The hump of the bull is well developed, that of the castrated male less so. There is a marked disparity in the size of the cow as compared with the bull, the former being probably stunted by the effects of too early breeding and too long suckling of the calf. The colour, of Burmese cattle varies but not to a great extent. Red prevails very extensively, after which come the various shades of straw, and next brown. Broken colours are rare. The trunk of the Burmese ox is well ribbed up and it is a fairly muscular and symmetrical animal, possessing great strength for its size. The head is small, markedly so in the cow; the horns are usually short and stunted principally on account of the custom which prevails of paring them down to give the animals a juvenile appearance. The neck is short and powerful but loses a good deal of its heaviness after castration. The dewlap is somewhat small. The Burmese do not castrate their cattle till they have attained the age of maturity. Castration is usually per-

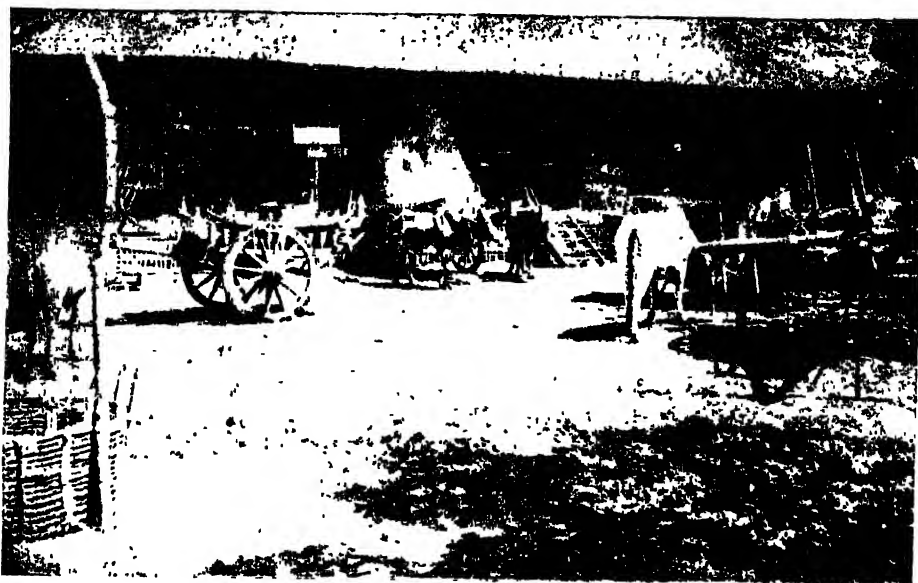


Fig. 5. Burmese Draught Cattle.

formed by crushing or beating, seldom by cutting. No system of selection of sires is possible as the cattle of each village are all kept together and the Burman has strong prejudices against the early castration of bulls, which he considers prejudicial to the growth and development of the male stock, and their future usefulness for agricultural purposes.

As milk producers the cattle of Burma occupy a very low place. The Burman cultivator seldom or never thinks of milking his cows. They are merely utilised to suckle the calves which they produce. This they go on doing from the birth of one calf till that of another.

As a rule, the Burman is very careful of his work-oxen, does not work them during the heat of the day and keeps them under shelter, either beneath his own house or in small banto sheds in connection with it during the night.

During the day the herd is driven out to graze, except when the crops are on the ground, at which season he cuts food for them. Waste lands in connection with holdings are always utilised for grazing purposes. a small amount of straw is stocked every year for the use of the cattle in times of scarcity.

IMPROVEMENT OF CATTLE.

DETERIORATION.

The subject of the deterioration of cattle in India has occupied the attention of both the administrators and agriculturists of the country. Many suggestions at possible means of improvement of the breed and actual attempts at doing so have been made, not without marked success. It has been pointed out that the causes of this degeneration of Indian cattle are: (a) the poorness of the food given to them, (b) the want of proper pasturage ground,

(c) over-work and being worked at too early an age, (d) being allowed to breed too young, (e) the scarcity of good bulls, (f) stinting of the calves of milk.

In various parts of India attempts have been made to improve the breed of cattle, by offering prizes for the best animals, exhibited at agricultural shows, but these attempts have on the whole, been but fitful.

The lack of care in mating cattle is another draw-back. The superior breeds which are reared under favourable conditions have not deteriorated, and with the spread of cultivation have increased in numbers, and to a certain extent supplied the working cattle required by extended irrigation. This extension has in turn provided a largely increased fodder supply.



Fig. 6. Sahiwal Cattle of the Military Dairy Farms.

DIFFICULTY OF IMPROVING.

Over the greater part of India the problem of improving the breed of cattle is, for various reasons, very difficult. Maimed, old and worthless cattle are kept alive until they die naturally, although they give no return, except manure for the food they consume. Fodder from natural grazing or cultivation is so scarce in many tracts that cows and young stock annually undergo semi-starvation in the hot weather. The working cattle are somewhat better cared

EFFECTS OF CROSSING.

Spasmodic efforts have been made for many years to improve Indian cattle by the distribution of bulls to District Boards and otherwise, but no results of importance have been recorded. In many cases failure has been due to the selection of unsuitable bulls, but in addition to this, half-bred cattle contract rinder-pest and other diseases in a most virulent form, and rarely recover under treatment while many indigenous breeds are comparatively immune.

GOVERNMENT FARMS.

It is recognised that the purity of the best indigenous breeds must be maintained, and that in areas where the cattle, though active and hardy, are inferior and small, they cannot be improved except by breeding from the best of their own kind. With this purpose in view, Government bull-breeding and bull-rearing farms have been started. These farms are stocked with cows and bulls carefully selected from the superior pure breeds; and as the breeding is under control, the young bulls are suitable for distribution among cattle of the same breed in tracts which are favourable for cattle-breeding.

VETERINARY ASPECT.

The whole question of cattle breeding is intimately interwoven with principles upon which expert veterinary guidance must be obtained, for it is the general experience of all countries that no progress can be made in developing the cattle industry unless the breeder is reasonably assured that his efforts will not be nullified eventually by the incursions of disease.

IMPROVEMENT IN BREEDING.

The improvement of the existing breeds is a question of many years. A beginning could be made by training the cattle-owners in the art and science of breeding and of selection. Most of the cows in India are not primarily produced for milking purposes, but are more or less incidental in the course of breeding of draught animals. Cows and bullocks are needed in this country only for two purposes, namely, milking and draughting. Beef is hardly used here as food and so



Fig. 7. Milking a Cow.

there is no necessity of breeding cows for that purpose as in Europe or in America. The bullock is the animal used here for ploughing and draughting purposes. The aim of breeding should be the production of a class of animal, the female of which would be our best milker, whilst the male would be our most efficient draught animal.

The bulls for breeding purposes must be selected very carefully from a pure breed of known milking qualities. Only such bulls should be chosen whose immediate ancestors and particularly the mothers and sisters, were or are known to be good milkers. It is not advisable to import expensive stock for the purpose of producing the "dual-purpose cow" for India. The half-bred progeny is usually delicate and very susceptible to disease. The cows give more milk but the quality of the milk is poor in fat as compared with the pure Indian breeds.

The calves are the means for the improvement of the dairy. By a gradual course of breeding, rearing, and development, the calves become the basis for all the skill of the dairy man's work in im-

proving his stock, and in increasing their valuable product. • Breed is made up of food and the most skilful care; and by judicious management the calves are developed into more useful and productive animals than their dams, until in course of time the improvement becomes fixed and is inherited by the progeny. It is in this way that the improved breeds have been made up.

BREEDING FARMS.

Cattle breeding farms in India managed and financed by the State, with a well-worked out programme which will be strictly adhered to until completed, constituted one of the most important factors in bringing economic success to the dairy industry in India. Not five per cent. of the cows of India to-day pay their way. The Government military farm at Ferozepur shows what can be done by the careful selection of animals of a recognised Indian milking breed, and the breeding up and ruthless culling of animals falling a certain standard. All the recognised dairy breeds of India should be given a fair trial as has been done at Ferozepore with one breed.

In addition all the recognised dairy breeds of Europe should be tried out by crossing females of Hissar, Kosli, Montgomery, Sahiwal, Sindhi, and other Indian breeds with Friesian, Milking Shorthorns, Brown Swiss, Ayrshire, Guernsey, etc., and the records carefully kept for a number of years. The opinion of the men best qualified to judge in India has settled down to the desirability of the dual-purpose type—the dual-purpose of milk production and draught.

The best cattle to-day are undoubtedly in the Government military dairies.



Fig. 8. Bullocks Ploughing.

REPORTS FROM CATTLE FARMS.

CENTRAL PROVINCE.

There is an increasing demand in the Central Province and Berar for cows and bulls of milking breeds such as the Sahiwal or Montgomery breed. During the last three years a herd of this breed has been established on the Telinkheri dairy farm, Nagpur.

•The Agricultural Department has now breeding farms and 2 dairy farms including the College Dairy Farm at Nagpur. Much difficulty was experienced in getting the basic stock for these farms, for there are no pure breeds in the provinces.

The results obtained on the Telinkheri Dairy Farm and on the College Farm at Nagpur in crossing cows of local breeds with Ayrshire bulls are promising as far as the milking qualities of the offspring are concerned, but the cross-bred bullocks produced are not of the type which would appeal to the ordinary cultivator.

The feeding experiments carried out on the College Dairy, Nagpur, show that when a mixture of cotton seed cake and *chuni* were the concentrates used and *juar* (*sorghum*) and hay the bulky fodder, the best results were obtained in the case of milch buffaloes when the quantity of concentrate fed daily was 58 to 60 per cent. of the milk yield. In the case of cows 40 per cent. gave better results.

ASSAM.

The principal work of the Agricultural Department in Assam in the improvement of cattle has been the maintenance of a herd of improved cows at the Shillong Farm. The farm was started in 1897 and a small herd of cows was located there almost from the beginning. A few cows belonging to what is popularly known as Taylor breed were obtained originally. This is a cross between the local cows and Australian bulls. The herd has been found to be thriving very well in the Khasi Hills. During recent years the experiment has been confined to attempts at improving the milking capacity of the cows by careful selection and management. To prevent inbreeding new bulls have been imported from time to time direct from Patna. 500 lb. per lactation is considered a very good average for Assam cows and that for Khasi cows is still less.

A very successful feeding experiment carried out at this Farm is preservation of green fodder in ordinary pit silos throughout the winter. The bulls, however, have not proved invariably satisfactory in the plains of Assam. In many places they have succumbed to

infectious diseases or wild animals. Whenever it has been possible to use these for very considerable periods they have left a distinct mark on their progeny particularly regarding milk yield.

BARODA.

The Baroda cattle-breeding farm and the palace dairy have been established a few years ago.

The Gujrat breed of Wadhia and the Kathiawar breed of the Gir cows have of late filled the minds of the public considerably, largely on account of the coincidence of their export by foreign purchasers and the rising price of milk and milk products.

No matter how much we may hope for greater utilization of the cow for dairy and draught purposes, so long as ghi remains one of the most important articles of diet of the people of this country, the unrivalled superiority of the buffalo as the ghi producer will always find a place for the buffalo in farm live stock keeping. On the other hand, no matter how persuasive we may be in the better utilization of the male buffalo, one half of the normal progeny of the buffalo must be considered as without economic value. The type to breed from in the



Fig. 9. Improved Bullock for Improved Cultivation.

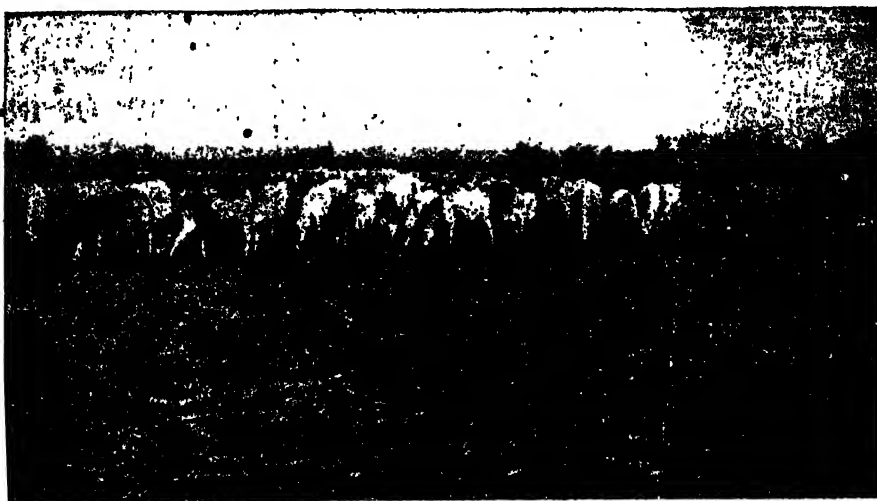


Fig. 10. Cattle Grazing.

case of the buffalo must, therefore, be different from the one fixed for the cow where both the male and female progeny are of economic value. The type to breed from in the buffalo class must be one which will persistently milk for a long period without annual intervention of the stimulation by calving.

DISEASES.

The principal epidemic cattle diseases prevailing in India are rinder-pest, anthrax in its several forms, epizootic aphtha or foot and mouth disease and less commonly, pleuro-pneumonia.

Direct Government interference to prevent their extension will prove efficacious only if the areas under which disease has broken out are placed under strict quarantine and the bullock traffic on the highway through infected parts is entirely suspended.

To be successful in the treatment of disease in cattle, it is necessary to

thoroughly understand and accurately interpret the various signs that indicate its presence, displayed in many instances by the attitude of the animal, and to form a correct diagnosis, three points should be remembered:

1. The indication of various ailments that animals exhibit, characteristic of disease.

2. A practical knowledge of the habit and disposition of cattle; and

3. The power of discriminating a healthy from an infected animal.

FODDER AND FAMINE.

Hay making is not practised by the Indian cultivator. Forest grass is annually allowed to rot on the ground, and reserve-stocks of fodder are not maintained. When famine is imminent, breeders will spend all their saving and make heroic efforts to keep their cattle alive. Fodder famine over extensive areas are rare; but dried grass and the

straw of arable crops are so bulky and light that transport is costly, while pressing into bales is expensive, though it reduces the charge for freight. The poorer owners of cattle are thus unable to import fodder or the more valuable auxiliary foods, such as the price of which rises in dry seasons. Although forests are temporarily thrown open to grazing in years of famine, the number of cattle which can be admitted is limited, while the difficulty of transport is often insuperable.

The need of gathering and storing surplus fodder in good years cannot be thus over-emphasized. It is on this source of supply that reliance must be placed to preserve useful cattle in years of scarcity in the areas most liable to famine. The grass now wasted, if cut at the right time, stocked and properly protected against rain, would remain good for years, and with oil cake and other concentrated foods would form substantial reserve against famine. The subject is, however, difficult owing to the question of expense. The fodder crops which are commonly grown are as nutri-

tive and productive as those of any country in the world, but the area occupied by them is smaller than suffices.

DAIRY INDUSTRY OF INDIA.

The dairy industry of India is acknowledged to be in a very bad condition and is in need of a thorough organisation along modern lines. Some of the principal facts regarding the milk problem in Indian cities may be summed up as follows:—

(1) The supply of milk in the cities is deficient in amount.

(2) The quality of milk supplied is bad from a chemical as well as from a bacterial point of view, the milk being adulterated as well as contaminated.

(3) The Indian milch cattle are very poor milkers and appear to be deteriorating. This is due to several causes, e.g., lack of scientific breeding, want of proper feeding, tending and housing, etc.

(4) The milk trade of Indian cities is mostly in the hands of the city *gowla* who has no idea of the principles of economic dairying and who is quite indifferent to the laws of hygiene and sanitation.

(5) Part of the milk supply of the cities is from the neighbouring villages where the ordinary cultivator keeps a few buffaloes and cows and supplies milk under expensive and very insanitary conditions, his ignorance and apathy are just as profound as that of the *gowla*.

(6) The price at which milk is sold in large cities like Bombay and Calcutta is very high and likely to rise higher

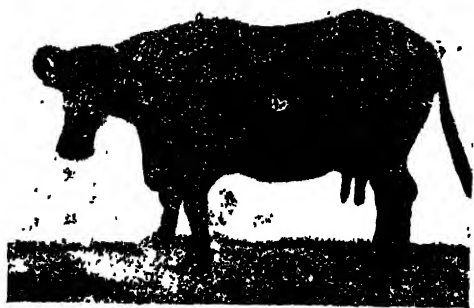


Fig. 11. Delhi Buffalo.

unless there is considerable improvement in the present methods of production and distribution of milk.

(7) There is considerable room for improvement both in the sanitary supervision and legislative control of the milk trade in India.

UNSATISFACTORY CONDITION

The unsatisfactory condition of the dairy industry in India is in a great measure due to the fact that the indigenous breeds of milch cattle—particularly cows are very poor milkers. With the exception of the Government dairies and a few private farms, no systematic attempt seems to have been made regarding scientific breeding in India. From what has been written before, it will be clear that the Indian milch cattle show a deterioration in quality, and that the number of good animals is rapidly diminishing. This may be ascribed to the following causes:—(1) Lack of scientific breeding. (2) Exportation of the best animals to foreign countries. (3) Removing certain breeds of cattle to other parts of the country where the climatic and other conditions are not suitable for them. (4) Supplying the large cities with thousands of milk cattle, which eventually fall into the hands of the butcher. (5) Occasional famines. (6) Defective feeding and tending. (7) Neglect of proper rearing of calves.

MILK SUPPLY OF TOWNS.

Although the question of milk supply to large city is the main topic for consideration, it is hoped that the question of small towns is not to be rigidly excluded. Even in small towns the supply of pure milk is getting an increasingly

difficult problem every day. The main reasons why the milk is getting scarce in almost every locality may be summarized as follows:—

(1) Gradual deterioration of the cows, due to want of good bulls and good feeding. (2) Want of grazing grounds. (3) High price of fodder and food grains. (4) Want of professional men to devote their whole time to the business.

MILKING QUALITY OF COWS.

The following characteristics are mentioned by Mollison as indicative of deep milking qualities of Indian cattle:— (1) Mildness of temper. (2) Fore quarters should be light in comparison with the hind quarters which should be massive and heavy. (3) A good milch cow should have wide loins, deep, well-packed thighs with back ribs long and well sprung so as to give a large haunch and a full flank. (4) The udder should be of large capacity, the larger the better, provided it is not fleshy. It should not be too pendulous, but should extend well forward on the abdomen and should come up well behind between the thighs. (5) The teats should be large and of equal size. They should be squarely set on the udder and not grouped in a cluster. (6) The milk vein should be prominent. (7) A lean and clear cut head, a thin long neck, a thin long tail, and a soft and pliant skin are also other points observable in a good milker.

MANAGEMENT OF BULLS.

The difficulties connected with the upkeep and management of district bulls become greater year by year. The people require bulls and appreciate them keenly but the responsibility of keeping them is



Fig. 12. Deccani.

not sought after. It appears to be unsound to give allowances for the upkeep of public bulls and moreover such an arrangement would be too great a tax on public funds. The present position is that while agriculturists are very keen on obtaining the services of a good bull for nothing the headmen, who are held responsible for the welfare of bulls placed in their charge, are unwilling to undertake their responsibility. Moreover, in too many cases the responsibility is very imperfectly regarded, and bulls are ill-treated or allowed to stray. If leading men could be induced to keep good stud bulls themselves and charge reasonable stud fees the question would be practically solved, but there is considerable aversion at present to the idea of charging for the services of a bull. A good scheme would be to assist any man willing to keep an approved bull by paying a portion of the purchase money from public funds or from a fund created for the purpose.

It is a matter of common experience that cattle fed on food rich in proteids and fats will yield milk of

a superior quality, particularly with regard to fat. This is why cotton seed, *chuni* and oil cakes form a part of the daily ration of the milch cattle in Bombay. Animals fed only on green and succulent fodder yield milk which is rather poor in fat and total solids, but the total quantity is appreciably increased.

LACTATION PERIOD.

The best age for Indian milch cattle for the maximum yield of milk is from five to eight years. There is very little change in the quality of milk until the animals begin to show senile decay, when the milk gets poorer as the animal gets aged.

The length of the lactation period varies a great deal in different animals and sometimes even with the same animal. It is common observation that from the time of calving to the time of "drying up" that is during the period of lactation, there is a definite relationship between the yield and the composition of milk namely that as the quantity diminishes the richness of milk increases proportionately.

IMPROVEMENT OF DRAUGHT CATTLE.

The improvement of draught cattle must be done chiefly through the use of good draught bulls. The maintenance of bulls at veterinary hospitals and Government farms for public service has been adopted as a means of awakening an interest in the matter.

Experimental work with dairy cattle is being carried on at Mysore on the Rayanakere dairy farm. Two breeds are being used as foundation stock, the local Mysore or Hallikar cow and Sind

cows. Crossing is being done on all cows with Holstein Friesian bulls.

Vitally connected with the improvement of live-stock is the subject of fodder crops. The cultivation of crops purely for fodder purposes is a phase of agricultural activity which needs extensive encouragement and increase. Sun-flower has been introduced and has shown itself to be a valuable fodder crop, withstand severe drought and yet yield well.

PROGRESS IN BREEDING FARMS.

BOMBAY

In the Bombay Presidency there are several breeds which have been fairly pure. Each one of these breeds has been bred to suit the particular condition of the tract in which it is found.

The Dangri, a small compact breed bred in the Western Ghats, is particularly useful in this stony region with a heavy rainfall. This breed is in all probability the only breed in India which will work in best rice lands—the buffalo excepted.

Each one of these pure breeds has been bred by a professional breeder.

In the Bombay Presidency each pure breed is practically restricted to 4 or 5 taluqs where professional breeders raise cattle. These areas are as a rule not in a very good state of cultivation and therefore it is practically impossible for the cattle breeder to produce a really sound good, pure bred bull.

MADRAS.

Cross breeding with Ayrshire, Sindhi and Sahiwal Cattle which was commenced at the Bangalore Military Dairy six years ago has been latterly transferred to the College Dairy at Coimbatore.



Fig 13 Jaffarabadi Buffalo Bull.

Cross breeding is being carried on in different parts of the presidency and advice is given to the public as regards feeding and rearing. A cross bred herd was purchased from Kirkee Military Dairy for the Central Jail, Vellore.

The Agricultural Demonstrator, Madras, advises the milkmen on the feeding and rearing of calves, but the milkmen do not pay much attention to his advice.

PUNJAB.

In an agricultural country like India, where the mainstay of the Zemindar is his livestock, the necessity for a properly organized veterinary Department is paramount. The Punjab has for many years enjoyed the reputation for being the premier province in India as regards veterinary organisation. The province for the purpose of veterinary administration is divided into three circles—the North; South and Central Circles, each in charge of a superintendent.

The Punjab can boast of having the premier cattle breeding station in India, namely, the Government Cattle Farm, Hissar, which is roughly 42,000 acres. About half this area produces in good

years fine crops of *anjan* grass, which permits of good grazing and at the same time allows for ten to twenty thousand maunds of good hay to be collected as a fodder reserve.

BIHAR & ORISSA.

The Government of Bihar and Orissa have adopted the policy of breeding cattle primarily for milk with a view to making the production of bullocks on arable holdings where stall-feeding is necessary, profitable. Herds of milch cows are started whenever a demand for milk gives an opportunity of maintaining them economically, cows of any breed being purchased and the best milkers retained and bulls of the Montgomery breed being used because this is the only Indian breed of which bulls with a good milking pedigree are obtainable.

There is a herd of about 60 cows at Ranchi and smaller herds on each of the large farms of the department at Cuttack, Sepaya, and Sabour. It is proposed to establish a large herd at Monghyr to supply the Railway settlement at Jamafpur.

BUFFALOES.

Tame buffaloes are found all over the plains and lower hills of India. They are semi-aquatic in their habits, and, during the hot season, may be seen rolling about in muddy holes half submerged or entirely under water with the exception of their nose.

Although ungainly animals, they are much more intelligent and docile than the cattle of India, and may be trained with the utmost nicety for agricultural purposes. In the cart they are used without a nose string and are guided by

by the touch of a wand or the voice of their driver.

Buffalo cows are much valued for milking purposes as they yield a much larger quantity and richer quality of milk than the ordinary Indian cow. A good buffalo will yield from 6 to 12 seers of milk per diem, and this milk being richer in cream, yields a larger proportion of butter and ghi than cow's milk does. The cows are therefore, kept for dairy purposes, while the males are castrated and used as beasts of burden and draught.

Buffaloes are very foul feeders, subsisting on the coarser grasses and the refuse left by oxen. In many parts of the country they are almost entirely stall-fed on stable litter which they devour greedily. Notwithstanding their coarse appearance and habits, they are very delicate animals and are subject to the same ailments that affect country oxen.

The principal breeds of buffaloes in India are five in number:—

(1) The Jaffarbadi or Nadhiali. These animals are very mild tempered and tractable in disposition, and the cows are, perhaps, the best milkers in India.

(2) The Ramnad breed is the best in Madras. The females are good milkers.

(3) The Gujrat breed is smaller than the Jaffarbadi, and yields less milk but of a richer quality.

(4) The Nagpur buffaloes are massive. The cows are excellent milkers and can stand more knocking about when in milk than animals of the other breeds. The males grow to an immense size and

are much used for heavy draughts.

(5) Deccan buffaloes are comparatively small in size, but are good milkers and are more hardy in constitution than the other breeds.

BUFFALOES IN THE PUNJAB.

At one time the prosperity of the Punjab agriculturist was judged to, a great extent by the number of cow buffaloes in his possession. This applied more faithfully when the produce of the buffalo was for home consumption. But the contraction of grazing in districts like Amritsar has led to buffaloes being kept instead of cows as it pays better to stall-feed a buffalo than cow. Owing to the great demand for ghi many men keep one cow buffalo where they formerly kept two cows. The idea obtains that the cultivation bullocks will be purchased with the money earned by the sale of the ghi from the buffalo.

Female buffaloes are highly valued by the people owing to their great milk-producing powers. The milk is made into ghi and sold and the butter-milk used for home consumption. The purchaser is usually the local *bania* who collects it and sends it to the big cities and towns in large quantities. In many cases it is taken as payment in kind of advances in cash for purchase of bullocks, seed, marriages, etc.

Cow buffaloes give from 4 to 15 seers of milk per diem and a very fair average is 8 seers or deducting that taken by the calf, 6 seers. As 16 seers of milk will produce about one seer of ghi and the present wholesale price of ghi is considerable; it is obvious that for at least eight months of the year a cow

buffalo is a very lucrative possession to the cultivator who has the available fodder. The *bania* or middle-man probably gets a big proportion of the profit, however..

Male buffaloes are used for work much more than formerly and the larger ones are very powerful. The Manjha animals have the reputation of being good workers though like all buffaloes they are slow and cannot stand the heat of the sun. It is usual to yoke a buffalo with a bullock in order to make him more quicker. Cow buffaloes that are barren may be used for work also.

The people take considerable interest in buffalo breeding and in some cases take their cows considerable distance to be covered.

According to the quantity of milk produced the leading breeds of both buffaloes and cows are poor milkers. As regards quality, it has been found that (both in Bombay and Poona) the milk of Surti buffaloes is richer in fat than that of any other local breed. As regards cows, it has been found that the Sindhi and Gir Cows yield a higher amount of fat than the other breeds. The half-bred animals from Sindhi cows and Ayrshire bulls yield the largest amount of milk in this country, although the percentage of fat is low.

The best breed of buffalo in India is the Delhi. Given the same ration as a buffalo of the local breed (Central Provinces), Delhi buffalo will give one-fourth more of milk.

The Buffalo Breeding Station which was commenced about seven years ago at Camalkot did not produce the desired

result. It was thought that by purchasing good buffalo bull calves from selected dams, and by good feeding a few good breeding bulls could be obtained.

STATISTICS OF

Indian Live-Stock for 1919-20.

Report on the First Census of live-stocks, ploughs, and carts in India, held between December 1919 and April 1920.

(i) British Provinces.

Bulls	5,673,850
Bullocks	43,506,372
Cows	37,197,807
Young stock (calves)	31,181,077

Total (Oxen) 117,559,106

Male buffaloes 5,463,866

Cow " 13,340,903

Young stock
(buffalo calves) 9,691,984

Total (buffaloes) 28,496,753

Total Bovine cattle 176,055,859

Sheep 22,690,729

Goats 24,389,139

Ploughs 23,596,231

Carts 5,750,183

(ii) Indian States.

Bulls 1,348,928

Bullocks 6,436,485

Cows 6,870,847

Young stock (calves) 5,010,475

Total (oxen) 19,666,735

Male buffaloes 876,540

Cow " 2,412,941

Young stock (buffalo
calves) 1,592,867

Total (buffaloes) 4,882,348

Total bovine cattle 24,549,083

Sheep 11,488,610

Goats 6,149,839

Ploughs 3,094,973

Carts 890,825

The census shows that there were 146 million head of bovine cattle (i.e. oxen and buffaloes) in British India. The provinces which possess the greatest number of oxen are Bengal, the U. P., Bihar and Orissa, and Madras. The United Provinces possess the largest number of buffaloes; next comes Madras, and then the Punjab and Bihar and Orissa.

There are 23 million sheep in British India, while there are 27 millions in the United Kingdom and about four times the number in Australia.

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Development of Cattle Breeding and Dairy Industry in India.

INDIA is overwhelmingly an agricultural country and the greatest field for her economic development and advancement lies in her agriculture. Something like 80 per cent. of her people are directly engaged in agricultural operations, and no matter how much Government may nurse or protect the manufacturing industries, India cannot permanently increase her wealth and standard of living unless and until she develops her agricultural resources and improves her agricultural practices. Such a development, however, cannot be brought about unless and until the question of improvement of the cattle of the country is effectively solved. India is a country where by reason of the smallness of her agricultural holdings, the cultivation of the soil, the harvesting of crops and the first stage in the transport of farm produce must be done by the bullock; horses, mules, mechanical tractors or donkeys are all unsuitable for one reason or other. No matter what crop is grown or what part of the country it is produced in, the field work too is done by the bullock. Outside of man himself he is the most universal, the most useful, and the most hardly used animal in India. Although the male of bovine species is called upon to do the whole of the cultivating work of India the female is seldom or never seen in the plough or the cart. She exists for the purpose of providing milk for her owner and for producing and, for a time, feeding the male draught bullock. Moreover, India is a vegetarian country

and her people desire milk and the milk products as part of their dietary. The cattle problem, therefore, is the most universal of all agricultural problems in this country from two different points of view, viz., (1) the whole country requires and must use a working bullock (2) the whole country needs an efficient milk producing cow. Economically then it must be granted that this problem is universal, but the economic effect of improved cattle efficiency is not only universal; it is so far-reaching in its effects that it would be quite impossible to calculate what an increase of, say 5 per cent. of Indian cattle efficiency would mean. It would mean better crops, heavier crops, and more crops, and who can measure the increase to the well-being of India which a 5 per cent. increase in the milk production of her adult female cattle would mean.

Generally speaking the quality of India's cattle is declining and there is room for great improvement in the efficiency of the work bullock and still greater need for increased efficiency in milk production. But the development must take place along dual-purpose lines. It is not enough to develop one side of the qualities of the bovine race and neglect the other. It can be proved conclusively that any particular type of work bullock required for any particular district or class of work can and should be the progeny of a profitable milk producing cow, and if that be so, it must be economically unsound to develop the

cattle of the country with a view to working qualities only or with a view to milk-producing qualities only. In the case of the draught type, without milk-yielding qualities in the female, the female is economically inefficient, and in the other case the male is practically wasted.

India, therefore, needs a cow the male offsprings of which would do justice to the yoke and female ones to the milk pail. This is what is meant by breeding on dual-purpose lines.

The cattle breeding and dairy industry in India is at present controlled very largely by people who do not understand the most elementary principles of the theory and technique of their vocation. The ordinary breeder is illiterate and notwithstanding his inherited knowledge acquired through centuries he has little knowledge of the principles of breeding by selection, and less knowledge as to modern methods of the growing and conservation of fodders for cattle feeding. The consequence is that breeding is largely a matter of chance and a poor chance at that, because the roaming cattle breeder is always short of money and the roving cattle dealers who look him up when it suits them have a keen eye for the best in the herd. The best males in the herd change hands and are purchased by the dealer who sells them again as draught animals with the result that the weedy males that are left have to act as the sires of the next generation. Under these circumstances and especially in the more jungly grazing tracts the herds year by year produce a larger percentage of almost useless animals.

Departments of Agriculture in India realise that the condition of the cattle in this country is one of the most essential factors affecting the development of agriculture. With the great increase in population which has taken place within the last 50 years the pressure on the land has also increased and much land, previously available for grazing, has been brought under the plough. Large expanses of culturable waste which once supported breeding herds are now producing agricultural crops. If cattle are to be reared at a profit in arable areas, the husbandman must have a cow which will give sufficient milk and at the same time rear a good-draught bullock. The muscular humped or zebu type to which Indian cattle belong has been developed mainly on draught lines but the combination of the two qualities of milk and draught is found to some extent in such breeds as the Sahiwal, the Sindhi, and the Thar-Parkar to the improvement of which a great deal of time and attention is now being given on certain Government farms.

In dealing with the milk problem the first consideration is how to improve the milk yield of our cows by better breeding and feeding. Two different methods of selective breeding are practicable. By the first method we start with the best Indian milch breeds and proceed to improve those breeds by selection, i.e., by eliminating animals of poor milking capacity and by breeding only from heavy milkers. By a law of nature the progeny of such cows are also heavy milkers, for like begets like. In order to find out the milking capacity of each

animal in a herd, a very careful record has to be kept of its daily yield throughout its different lactation period. In establishing pedigree similar records have to be kept of the performance of its progeny, so that for every animal of good pedigree there should be a record not only of the yield of milk which she herself has given, but also of the yield which her ancestors have given. This is what we understand as breeding on scientific lines. Valuable work has already been done on these lines in establishing pedigree herds of milch cattle on the dairy farms managed by the Military Department and the Imperial Department of Agriculture in this country. The quality of the work done has been distinctly good, it is the quantity which is open to criticism. For want of funds it has not been possible to do more.

The method of selective breeding which has been just described must necessarily be a slow process in India where except on Government farms nothing has been done in the past to establish pedigree. To evolve the fine herds of Great Britain has taken well over a century. "Why", it may be asked "don't we start off by importing bulls of such herds." This, as a matter of fact, is already being done. Bulls of good pedigree have been imported from Great Britain for use on Government dairy farms in India and have, as was expected proved prepotent. Herds of cross-bred cows giving a large yield of milk have in this way been built up on Government farms within the last few years. But this system of breeding has its drawbacks, for the cross-bred stock produced are less immune to the epidemic diseases of this country than *deshi* cattle, and the

bullocks are less hardy as draught animals.

In the matter of improvement of cattle India is passing through a phase similar to that which prevailed in England about the middle of the eighteenth century but with this difference:—in England the improvement of cattle by selective breeding was initiated at that time by "gentlemen" farmers, while in India it is being done by Government. The foundation of distinct breeds is now being laid by agricultural departments and improvement is being effected in those breeds by selective breeding, crossing, better feeding and housing. In this way the milk yield of the herd of Sahiwal or Montgomery cows on the Pusa Farm has been doubled within the last 15 years. Several of these cows have given over 6,000 lb. of milk in a lactation period; while one of the cross-bred Montgomery-Sahiwal cows in the herd has given 12,000 lb. which is about 12 times the yield ordinarily obtained from the draught breeds of this country. In years to come cattle breeders will trace with pride the origin of their pedigree herds to the Pusa and other Government herds which are to be found in India to-day; for from these herds bulls of good pedigree are already being supplied to cattle owners for stud purposes. In this work of cattle improvement the Veterinary Department is rendering valuable assistance. The excellent results obtained by the Imperial Veterinary Research Institute at Muktesar in the immunisation of herds against rinderpest by the simultaneous method of inoculation is worthy of special mention.

—BY DR. D. CLOUSTON
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A NOTE ON THE CATTLE OF INDIA.

WHATEVER ignorant or interested persons may say, the fact remains that the number and quality of cattle that we have at present in India are quite unsatisfactory both for the purposes of production of milk and cultivation of land. The numerical inadequacy will be evident from a comparison of the proportion of cattle to population and area of India with that of other similar countries of the world; thus, the proportion of cattle to population in Denmark is 25 per cent. greater and in New Zealand 150 per cent. greater than that in India, while the proportion of cattle to area in Denmark is 50 per cent. greater and in New Zealand 125 per cent. greater than that in India.

Next let us consider if we have got sufficient plough-cattle to till our lands, and milch-cattle to supply us with milk. According to agriculturists and agricultural experts one pair of bulls or bullocks can cultivate only 5 acres of land during a season. There are about 228 million acres of arable land in British India and of the total number of bulls and bullocks, deducting 25 per cent. as sick, infirm, too young or too old, and another 25 per cent. as being diverted for other purposes such as draught and the like, we get only 24 millions of cattle for the purpose of cultivation. This works as 19 acres per pair of cattle, whereas this area would require in the ordinary course at least 4 pairs.

Similar is the inadequacy of milch-cattle. There are in India 254 millions of people and 50 millions of milch-cattle. Taking the average yield of milk per cattle to be 2 pints per day for 7

months in the year we find that each person gets $\frac{1}{4}$ pint of milk a day, whereas the need per individual is reckoned at 2 pints at least a day.

Coupled with this numerical inadequacy when we consider the growing deterioration of cattle and the depletion of the best breeds due to indiscriminate slaughter and export, and the terrible results that have followed viz., appalling infant mortality and gradual shortage in the rate of out-turn of crops the importance and urgency of the question of preserving and improving the cattle-resources of the country can be very well realised.

The main factors, which contribute to the present unsatisfactory condition of cattle in India are (1) want of proper breeding; (2) want of grazing grounds; (3) indiscriminate slaughter and (4) export.

Let us consider these items one by one.—

BREEDING BULLS.

The deterioration of cattle in India is mainly due to want of good breeding bulls. The old Hindu system of breeding by means of sacred Brahmini bulls was a good one from the point of view of the cattle themselves, because it ensured that the calves dedicated were picked animals and the practice of allowing them to roam at will, ensured that they were well fed and had plenty of exercise. Unfortunately these bulls are deteriorating not only in Bengal but in other parts of India as well.

A Committee appointed by the Board of Agriculture in India to consider the

question of improving breeds of cattle after careful investigation came to the deliberate conclusion that "the drain on the existing breeding centres had become so severe that the price of cattle was eating seriously into the profits of such cultivators as rely exclusively on them for their plough-cattle." The Committee held that the number of cattle breeding stations were "wholly inadequate in nearly all provinces" and recommended an increase in their number. The Committee further remark that "there appears to be a distinct danger of valuable indigenous breeds dying out." It is most essential that separate farms should be devoted by Government for maintaining the purity of these breeds. Certain definite tracts should be recognised as breeding tracts and effort at first concentrated in these areas, and special staff attached to them who will devote themselves to the question of supply of bulls, regulation of breeding, advising as to rearing, etc." The Committee further recommend the distribution of breeding bulls amongst villagers taking close personal interest in the matter, amongst co-operative societies, selected malguzars upon certain terms such as keeping the bulls in proper condition and lending their services to their neighbours for reasonable charges.

GRAZING GROUNDS.

The next important draw-back is the want of adequate pasture grounds for the use of cattle.

The subject came up for discussion before the Board of Agriculture in 1913 and a Committee then appointed made the following recommendations,

which were unanimously accepted by the Board, viz:—

- (a) "Preservation of grazing grounds by legislation. All restrictions of grazing rights to be deprecated." Local officers and Local Boards to be made to demarcate grazing areas and prevent them from being encroached upon.
- (b) "Improvement of waste areas. This should be systematically undertaken by the Forest Department acting in close association with the Agricultural Department; and the land thus reclaimed to be thrown open for grazing.
- (c) Legislation to prevent further encroachment upon existing grazing grounds, and authorising local Bodies to expend a portion of their income for acquisition of grazing areas.
- (d) Acquiring grazing grounds at the cost of the State, local bodies, etc.
- (e) Reafforestation by the Forest Department.

A pseudo-economical issue is often raised that the conversion of grazing grounds into cultivated areas help raising of crops for human consumption and this natural tendency should not to be stopped. But is it really so? What do they do in other civilised countries? They do not encroach upon pasture grounds but resort to intensive methods of cultivation by raising more crops from the same areas. "In Bengal at the present time waste land is being encroached upon, be-

cause it is more profitable to cultivate it than to retain it in waste. In Great Britain the opposite tendency is manifested, viz., to gradually throw more and more cultivated land into pasture." The utter hollowness of the proposition will be realised when it is pointed out that by extension of cultivation we do not get greater out-turn of crops, and the reason is simple. We have not got, as proved before, sufficient number of plough-cattle to properly cultivate the existing arable land, and the inclusion of further land within cultivated areas inevitably means indifferent cultivation followed by no crops or a very small out-turn of crops *plus* decimation of cattle. There is thus no use in encroaching upon pasture grounds. It is false economy.

CATTLE SLAUGHTER.

Perhaps the most important of all matters relating to the subject worth the most prompt and serious consideration is the indiscriminate slaughter of cattle. No doubt superficial observers may say that we have a sufficiency of cattle and what is needed is to weed out, say 2/3rds of their existing number for the ostensible reason "that 90 per cent. of these cattle are an economic loss to the country i.e., the cow does not pay her board in the milk and offspring which she gives." So the abominable system of slaughter that is going on in the town and cantonments should not be interfered with. Any one who has cared to make a little deeper study of the matter will readily find that the manure-value of the dung and urine of the cow gives sufficient return for her board. The

cow is not so abundant as she is supposed to be. The best cattle in the prime of their lives are sent to the towns where they are usually subjected to the cruel *phooka* process, and as soon as they cease to give milk they are handed over to the butcher. Thus instead of leading a useful life of 10 or 12 years, she is put an end to at the end of her first or second lactation period. In this way the best cattle of the country are being eaten up, leaving only the worthless and the inferior stock. There is little doubt but that the town dairies are producing a serious drain on the best milking cattle in the country. The percentage of good milkers amongst Indian cattle is so small that this may in the end bring about serious results. The question of the preservation by Government agency of the best milking cows in the country is therefore an urgent one. In this way the present and future generations of good cows are gradually and speedily being exterminated. Attempts made from time to time to prevent this serious drain by the Municipalities failed owing to defective legislation which, it is said, precludes these bodies from enforcing restrictive resolutions. This is highly deplorable. In all civilised countries there exist laws for preserving breeds of cattle and birds by penalising their slaughter. It is a pity that similar measures by the Indian legislature have not yet been considered fit for adoption in this country in spite of the strongest recommendation of the Government experts themselves. Cattle are also slaughtered for the dried meat trade and the trade in hides and the number of

cattle annually slaughtered is estimated to be something like 10 millions out of a total stock of 145 millions. It appears to be incumbent upon the Government to introduce legislation authorising local bodies to stop the slaughter of useful cattle, at least cattle which are capable of giving milk.

CATTLE EXPORT.

The export of cattle is a comparatively minor matter no doubt, but it is the quality of the cattle exported that makes the situation worth serious consideration. The Ongole, Punjab and Bombay cattle are chiefly exported to the Malay Peninsula, South Africa and South America, and the export trade has considerably increased of late after the war. It is producing detrimental effect in some parts of India, by causing an undue drain on the cattle of those parts. The unsatisfactory point in the trade is that the Indian breeder has not become sufficiently conscious of the true value of a well-bred bull, and usually parts with it at a price which represents half its value. There is a need for the Government looking into the matter and for the exercise of control and discrimination in the working of the trade.

A committee appointed by the Board of Agriculture in 1916, reports, that three breeds are usually exported: viz. (1) "the Kankrej breed from North Guzerat, (2) the Karachi breed from Bombay and (3) the Ongole breed from Madras. There has been relatively large exports of the last 2 breeds of cattle and the export, which is made for breeding for meat has considerably depleted the breeds." Another committee appointed in 1919 re-

commended the "levying of an export tax of say Rs. 10 per head on all animals from the Ongole tract exported by sea from Madras" as also from other centres. Many Indian States such as Bansda, Barwani, Chamba, Sarila, Sayla, have stopped export of cattle outside India, and it would be well, considering the present scarcity of superior grade cattle, to stop the export altogether for a few years until the number of good cattle returns to its normal condition.

—BY BABU NILA NANDA CHATTERJEE,
M.A., B.L.,

FARM YARD MANURE.

FARM yard manure is the mixture of the liquid and solid excrements of farm animals with straw, etc., used as a litter. It is regarded as the typical manure by farmers and others because it is supposed to contain all the ingredients required for the growth of crops, and also because it causes a certain amount of disintegration of the soil as well as warming certain lands. Still, it is far from being a perfect manure. Farm yard manure may contain all the ingredients of plant growth but they are not present in the best proportions. The composition of farm yard manure varies considerably.

The composition naturally varies with the nature of the animal making the dung, the kind and amount of food it receives, the proportion between excreta and litter, the nature of the litter, and the extent and character of the decomposition which has taken place in the manure itself. The utility of the

manurial constituents varies according as they are present in the food as digestible or indigestible compounds, for example, part of the proteins of the food withstand the action of the digestive ferments and are excreted unchanged in the faeces, but to a much greater extent they are broken down into soluble compounds which pass into the blood and eventually are excreted as urea, uric acid, etc., in the urine. Similarly for the phosphoric acid and the potash in the food, whatever is digestible is excreted in the urine in some simpler combination whatever resists digestion passes out unchanged in the solid excreta. Hence a great difference in the manurial value of the two portions of the excreta, the compound in the urine—urea, uric acid, soluble phosphates, and potash salts are either ready for the nutrition of plants or require but slight further changes to become so, whereas in the solid dung the materials have several stages of decomposition to go through before they can reach the plant, and having already shown themselves able to resist the attacks of the animal's digestive ferments they are correspondingly unaffected by the ordinary decay processes in the soil. The proportion the digestible bear to the indigestible constituents of a food varies with the nature and even with the mechanical condition of the material, also the kind and age of the animal.

It has been ascertained that the urine of sheep and horses is much more concentrated than that of cattle and pigs, similarly the solid excreta of the two former are also the drier. It is this greater dryness and richness which is the

cause of horse manure being described as "hotter" than that produced by either cows or pig; bacterial changes take place in it much more rapidly, a greater amount of ammonia is produced, and the rise of temperature is more pronounced.

The next factor which enters into the composition of the dung is the nature of the litter on which the animals are placed. The litter has a two-fold function: it absorbs the urine and other liquid portions, and it provides both organic matter and nitrogen for the resulting manure.

Howsoever the farm yard manure has been made, it thus starts a mixture of excrement, urine and litter which become more or less consolidated and mixed together by the trampling of the animals. Other changes, however, intervene rapidly, and these in the main are brought about by bacteria, which for convenience may be divided into two groups, one acting on the cellulose and other carbon compounds of the straw that make up the bulk of the manure, and the other acting on the nitrogenous compounds that do not weigh so much but supply the main fertilising properties of the dung.

Farm yard manure thus owes its value partly to its chemical, partly to its physical, and partly to its biological effects. The elementary constituents are carbon, hydrogen, oxygen and nitrogen, which constitute the non-metallic part; potassium, phosphorus, calcium, which constitute the metallic part, both being of value; with some small amounts of aluminium, iron, and silicon which may be considered as hav-

ing no value. These materials are combined together as humus, organic fibre and salts. Water is present to the extent of from 60 per cent. to 99 per cent. Farm yard manure is by no means a dead thing. It is full of bacterial life, which has a strong influence on its value. Considering, first of all, the forms in which these elements of value occur, we find that the nitrogen is very rarely indeed in the oxidized condition of a nitrate. Very old heaps of farm yard manure, say two years old, certainly do contain small quantities of nitrate, but this age is not usual in farm practice. An important fraction of the nitrogen is present in the form of ammonia, which chiefly occurs as the result of the decomposition of urea. Urea is fermented by a special micrococcus, so that in a day or so the urea has become completely converted into ammonium carbonate. The ammonia so produced will very likely reach with some of the sulphate present, so that in the manure heap the ammonia will be partly as ammonium sulphate. In addition to this, as the organic matter is decomposed by bacterial action, a portion of it will form those vague compounds which is known as humic acid, which will enter into combination with the ammonia and produce the soluble, dark-brown coloured substance, ammonium humate. Some nitrogen is also present in the amide form. Urea itself is an amide, but is not the only one present. Many other amides are produced by the action of bacteria upon proteins. Amino-acids and peptones are also present. A fair proportion of the soluble nitrogen which

exists in the manure heap results from the bacterial digestion of the proteins. Many of the bacteria in the manure heap belong to the class that liquefy gelatine. The liquefaction of gelatine is only a special easily observed case of the peptonization of proteins, and a part of the proteins which have not been digested by the beasts goes into the peptone form in the manure heap. Of the albuminoids in the dung, some are soluble but most are not merely insoluble in water, but very resistant to all chemical change; indeed part of the proteins that are passed by the beasts is the residuum of dead bacteria, which needs protracted decomposition.

The basis of any scheme of manuring must in general be farm yard manure, and the success of the scheme will vary as this is well or badly managed. But unfortunately there is often more waste of farm yard manure than of anything else on the farm, and most valuers would reckon that half of its goodness never reached the crop at all. Probably in no single direction is so much improvement possible as here. As a general rule the richness of the manure depends on the amount of albuminoids or proteins in the food, and not on the amount of oil, because the albuminoids contains nitrogen, the most important constituent of the manure. Nowadays the potash is becoming increasingly important. The most economical procedure is to apply the manure at once to the land directly it is drawn out from the yards. The proper time for doing this depends on the crop and the climate.

HONEYED JUICES.

(By A Special Expert.)

WHILE fruit preserves and fruit syrups are well-known, fruit juices preserved in honey—rather in a state of mixture with it—are an innovation. This extremely palatable article of diet may be prepared according to the recipes given below. The process is simple, honey being a natural preservative.

The directions for the use of these "honeyed juices" may be noted here. Take 1 oz. of the "honey" and blend it in 1 oz. rose water; then dilute the mixture with 4 oz. water; add ice and sip off like *sherbet*. The body will keep cool for a long time and the mind will be refreshed. It will also invigorate the physique and is thus beneficial to health. But do not eat any hot substance nor indulge in any work that might generate heat at least for one hour after taking the cooling drink.

ROSE.

Take $\frac{1}{2}$ sr. petals of good French rose or of Bussorah rose and $\frac{1}{2}$ sr. distilled water. Put them together in a vessel for seven days. Then mix into it 3 lb. honey and leave for 7 days. Finally squeeze out the honey liquid and store in a phial.

ORANGE.

Take 1 lb. of the gotes of oranges free from skin and soak them in 1 lb. distilled water for 4 days. Then mix into it 3 lb. honey and leave for 7 days. Finally squeeze out the honey and juice, and bottle.

APPLE.

Take 2 lb. of peeled oranges and cut them into thin slices. Soak them in 5 lb. honey, put in a vessel and close the mouth by fluting with mud. Leave it in a cool place for one month. Finally strain and use.

PLANTAIN.

Select good ripe plantains of the *Champa* variety and peel them. Mash 4 lb. of these plantains, pour on the pulp 3 lb. honey and close the lid well fluted. Leave for 7 days in a very cool place so that it is not heated by sun's rays or any

other cause. Finally squeeze out the honey and bottle.

GRAPES.

Take 1 sr. good ripe grapes and mash them one by one; put them in an earthen vessel and pour 3 srs. honey. Close the mouth by fluting with mud and wrap all round it a piece of cloth. Now plaster the vessel (over the wrapping) with a thin coating of mud so that no spot is omitted. Next leave the vessel in a cool place for one month. Then pour out the contents and squeeze out the honeyed juice. Bottle it carefully.

BAEL.

Scrape out the pulp of ripe *Bael* (Bengal Quince) and reject the seeds. Soak 2 lb. of the pulp in 1 sr. water for 48 hours. Then strain only the water and mix into it 3 lb. honey. Put in an earthen vessel and close the mouth. Leave for 15 minutes in a cool place and after that bottle it.

LOTUS.

Take half seer petals of lotus and put in a clear earthenware vessel. Pour $\frac{1}{2}$ sr. water and allow to soak for seven days. Afterwards mix into it $1\frac{1}{2}$ srs. honey and leave for 7 days in a cool place. Finally squeeze out the juice and bottle.

ROSE APPLE.

Select ripe rose apples, cut them in halves; and reject the stones. Take 2 srs. and put in an earthen vessel. Pour 8 srs. honey into it; close the lid and flute with mud. Plaster the vessel all over its outer side with mud and place it embedded in a heap of paddy. Finally squeeze out and bottle.

GUAVA.

Select good ripe *Bewres* guava. Peel and reject the slimes and seeds. Take 1 sr. of the pulp only and soak in 1 sr. water for 24 hours. Then mix into it 5 srs. honey and leave for 12 days. Finally mash well and use after straining.

ALMOND.

Take $\frac{1}{2}$ sr. good almonds of the *Kagzi* variety, and finally chop them after spinning. Soak them in $\frac{1}{2}$ sr. water in a clean earthenware vessel for a week.

Then mix into it $1\frac{1}{2}$ srs. honey and leave for 10 days. Next squeeze out thoroughly and strain through fine cloth. Bottle carefully.

CURRENTS.

Take 1 sr. currants, pick out the stalks, free them from dust and wash them clean. Cut them into halves one by one and soak in 6 srs. of honey in an earthenware vessel. Cover the lid and flute it with mud also plaster the outside of the vessel with mud. Place it in a cool place for a month. Then press out the juice thoroughly and bottle.

MANGO.

Select good ripe mangoes of the Bombay type; peel and slice. Take 1 sr. of these slices put in an earthen vessel and pour into it 3 srs. honey. Cover up the lid and flute it with mud. Leave it in a cool place for 15 days. Then pour out the contents on a piece of cloth—mash thoroughly and strain. Bottle and use occasionally.

PINE-APPLE.

Take 1 sr. ripe pine-apples; peel and reject the eyes. Cut them into thin slices; soak them in 1 sr. distilled water for 12 hours. Now strain the water only and mix into it 3 srs. honey. Close up the mouth of the vessel and leave in a cool place for 1 month. Finally strain and use.

APRICOT.

Take $\frac{1}{2}$ sr. good apricots and wash them clean, soak them for 12 hours in water. Take them out when plump and soft and steep them in 2 srs. honey for 7 days. Then squeeze out the juice and bottle.

MUSK-MELON.

Take good ripe musk-melons; peel, cut in quarters and reject the skins and seeds. Take 2 srs. slices and wash them thoroughly. Cut them into small pieces and steep them in 2 srs. honey. Put in

an earthen vessel, flute the lid with mud and leave in a cool place for 1 month. Afterwards strain through a piece of cloth and use.

SANDAL.

Procure 1 poa dust of sandalwood (white) and soak in $\frac{1}{2}$ sr. distilled water in an earthen vessel for 15 days. Afterwards mix into it $1\frac{1}{2}$ sr. honey and leave for 1 week more. Wring out and bottle the juice. This is a very efficacious thing.

PEACH.

Select good ripe peaches; cut into halves and take one seed. Soak them in water for 24 hours and then mix into it 3 srs. honey. After 3 days press out the juice thoroughly and use up.

BUTTER.

Pure and fresh butter 14 lb; clarified honey 1 lb. Macerate these two ingredients in a stone mortar. Store the mixture carefully in a glass jar.

It is a nourishing food for infants and invalids and a mild laxative.

KETAKI.

Select tender leaves of Ketaki and finely mince them. Take 2 lb. of the choppings in a vessel and mix with 4 lb. honey. Seal the lid well, plaster all over with mud and leave in a cool place for a month. Afterwards press out the juice thoroughly.

ANISEED.

Take $\frac{1}{2}$ sr. cleaned, picked and washed aniseed; soak in $\frac{1}{2}$ sr. water for 7 days. Then mix into it $1\frac{1}{2}$ srs. honey and squeeze out the juice after 7 days.

CLOVES.

Take 1 poa well-picked cloves and soak in $\frac{1}{2}$ sr. water for a week in a suitable vessel. Mix into it $1\frac{1}{2}$ srs. honey and leave for a week more. Finally strain and bottle.

This is to be used only in the winter season.

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Small Trades & Recipes.

Condition Powder.

It is a tonic for horses, cattle, sheep and goats:—

Black salt	1 lb.
Sulphur	1 lb.
Dried Ginger	1 lb.
Chiretta (powdered)	1 lb.
Camphor	$\frac{1}{2}$ lb.
Ajwan	1 lb.
Mustard seed	1 lb.
Methi	1 lb.
Turmeric	1 lb.

The ingredients are to be well powdered and mixed together. From $\frac{1}{4}$ to $\frac{1}{2}$ ch. to be given to each animal every morning and evening. Half the quantity for goats, sheep, and calves, continue for a month.

It should be given with the food or given in half a quart of water as a drench.

Papeeta leaves and green fruit will often bring back a flow of milk if it has stopped from any disorder in the cow's health. The leaves and fruit should be pounded together, and mixed with a little flour and treacle and given in balls.

Lime Juice Glycerine.

Almond oil	3 $\frac{1}{2}$ oz.
Oil of Lemon	1 dr.
Lime Water	8 oz.
Glycerine	1 dr.

Mix well by shaking.

This cream separates a little clear oil, but is a good article.

Tobacco Flavour.

Tincture valerian	2 dr.
" tonka	6 dr.
Coumarin	15 gr.
Spirit Jamaica	2 $\frac{1}{2}$ oz.
Extract violet	10 oz.

Ringworm Ointment.

Chrysophonic acid	1 scruple.
Oil of Dill	2 dr.
Lanolin	1 oz.

Mosquito Pastilles.

Powdered charcoal	16 oz.
Potassium nitrate	2 oz.
Benzoin	4 oz.
Hard tolu balsam	2 oz.
Insect Powder	4 oz.
Tragacanth mucilage—sufficient quantity.	

Powder the solids, make into a stiff paste with the mucilage and form into rolls.

Polish for Silver.

	By Parts.
Carbonate of Magnesia	30.
" " Lime	30.
Kieselguhr	15.
Dextrine	2.
Water	15.

Knead ingredients together to form a stiff paste, and then press into metal boxes and dry. The user should be instructed to first moisten with ammonia the rag which is to be used.

INDIA'S INDUSTRIAL PROGRESS.

Royal Agricultural Commission.

The Royal Commission's task is "generally to examine and report on the present condition of agricultural and rural economy in British India and to make recommendations for the improvement of agriculture and for the promotion of the welfare and prosperity of the rural population."

The Commission is particularly to investigate:—

Firstly, the measures now being taken for the promotion of agricultural and veterinary research, experimental demonstration and education for the compilation of agricultural statistics, for the introduction of new or better crops and for improvement in agricultural practice, dairy farming and stock-breeding.

Secondly, the existing methods of transport and marketing of agricultural produce and stock.

Thirdly, the methods by which agricultural operations are financed and credit afforded to agriculturists.

Fourthly, the main factors affecting rural prosperity and welfare of the agricultural population.

It will not be within the scope of the Commission's duties to make recommendations regarding the existing systems of land ownership and tenancy or of the assessment of land revenue and irrigation charges, or the existing division of funds between the Government of India and the Local Governments. The Commission shall, however, be at liberty to suggest means whereby the activities of

the Governments in India may best be co-ordinated, and to indicate the directions in which the Government of India may usefully supplement the activities of the Local Governments.

Indian Tanning Industry.

Exchanges are taking place in the kip tanneries of India and modern methods of tanning are being applied in the Calcutta tanneries for tanning harness and saddlery leathers for Army purposes. It is hoped that the Bengal tanneries will soon be able to meet the greater part of these requirements for the Indian Army. Greater progress has been made in the manufacture of box leathers from dry salted cow hides, and experiments have been carried out on Rangpur and Dinajpur hides. They are given a five to six days liming, and are then one-bath-chrome tanned. Leather prepared in this way has a tight grain and good appearance and finish, but it lacks the toughness and softness of the European productions.

Other researches aimed at producing better sole leather from buffalo hides. A mixture of Sonali (Cassia Festula), goran bark (Cercops Roxburghiana) and myrobalans was used. Sonali acts like bablah, as it counteracts the reddish tendency of the goran bark. The leather was brighter than a myrobalans-goran bark-bablah mixture. Researches are also in progress re the chamoising process.



SCIENTIFIC AND TECHNICAL TOPICS.



Revolving Electrons.

The analogy between the atom and the solar system, first pointed out by Bohr, has received a remarkable confirmation from the works of Drs Uhlenbeck and Goudsmit, of Leyden.

The periodicities of the different types of light given out by an atom depend upon the orbits traversed by the electrons moving round its central nucleus. But what at first sight are single spectral lines generally turn out, on close inspection, to be groups of rays of very slightly differing frequency.

To explain some of these fine differences, the Dutch physicists postulate that the revolving electrons, like the planets, spin round their own axes. This leads to precession, or slow rotation of the poles of the electrons, analogous to the movement of the earth's pole, which causes the precession of the equinoxes once in 26,000 years.

Just as the frequencies of the main spectral lines depend on the relatively short "years" of the various electrons, so are the differences between the frequencies of their components related to the precessional periods, which are much longer.

As is usual in the case of atoms, the period of the electron's "day," as well as of its "year," is determined by the principles of quantum mechanics.

Glass Marvels.

At the Optical Convention that was recently held in England several new kinds of glass were exhibited which are expected to be very useful for special purposes. One of these is "calorex," a roofing glass which has the property of absorbing the maximum amount of heat consistent with transmitting a predetermined amount of light. It has its value in hot climates or in factories where it is desirable to keep goods at a low temperature and yet to take advantage of natural daylight. Yet another glass with suitable absorptive properties has been produced for the glazing of buildings where the contents are liable to be damaged by the chemical action of ultra-violet rays.

There are now special glasses which depend not, as in these cases, on the exclusion of certain portions of the spectrum, but on the transmission of certain wave-lengths absorbed by ordinary window-glass. Another new form of glass is a "daylight" glass, the result of a number of attempts made during the last 20 years to find a single filter which when used in combination with some artificial source of light—in this case a half-watt lamp—will give a light which is a spectroscopically correct equivalent for daylight. The new glass known as vitaglass, which has the property of being transparent to a large extent to ultra-

violet rays, has proved useful in hospitals and other institutions, and has also been used for the glazing of houses.

The Nutritive Value of Egg.

The yolk of egg is very useful for anaemic people. The yolk of egg has as much supply of calcium as milk. It seems as if these calcium salts are also present in organic combination, and are therefore very easily used. In regard to vitamins, the yolk has proved a useful source of one of these food essentials. The fat in the yolk prevents the eye disease known as Xerophthalmia. Nine eggs have about the same nutritive value as one pound of beef. They may therefore readily be used as substitute for meat. Eggs therefore have the same total nutritive material as meat, but are richer in fat and poorer in protein.

During the digestion of meat, purins are yielded which are responsible for gout. This food is therefore eliminated from the diet when this disease is being treated. In the egg there is no such substance present, so that it can be used freely in such a diet. One egg is equal to $\frac{1}{2}$ glass milk or to $1\frac{1}{2}$ oz. medium fat meat.

Origin of Colours.

Turkey red is made from the madder plant, growing in India.

The exquisite Prussian blue comes from fusing horses' hoofs and other refuse animal matter with impure potassium carbonate.

Gamboge is from the yellow sap of a tree in Siam.

India ink is made from burned camphor.

Mastic comes from the gum of the irastic tree, which grows in Greece.

Raw sienna is the natural earth from the neighbourhood of Sienna, Italy and umber is an earth found near Umbria.

Blue-black comes from the charcoal of the vine-stock.

The camel furnishes Indian yellow and the cuttle fish gives sepia, which is an inky fluid, the fish when attacked, discharges to make the water opaque.

Black is the soot of wool ashes. Scarlet is iodide of mercury, vermilion is from the ore cinnabar, and the Chinese white is zinc.

The gorgeous carmine, crimson, scarlet-carmine and purple lakes are furnished by the cochineal insects.

Warmth by Wireless.

That it is no more improbable to broadcast heat waves than it is to broadcast sound waves is the view of an American Physicist. But, he states, much research work must be done to discover instruments capable of controlling heat waves, and a detector that will anticipate the waves, hold them, and amplify them.

It is known that heat travels through space and through solids, and when once we learn how to pick up these waves and control them, heating throughout the world will be revolutionized.

Heat broadcasting will mean better health to the public, because it may remove from the air the impurities of modern heat-making systems.

FORMULAS, PROCESSES & ANSWERS.

Analysis of Mohwa Oil.

1104. B. B. H., Morar -Wishes to learn the analysis of Mohwa oil for soap making.

Saponification value	188.4
Iodine value	50.1
Sp. gr. at 100.C	0.8854
Melting point	35.5-42
Solidifying point	25-36
Melting pt. of Insoluble	
fatty acids	54.5-55.5
Solidifying pt. of	
acids	52.5

Butter Substitutes.

927. M. T. M., Karachi.—Writes, "Can you suggest for preparing butter substitutes like the vegetable products sold in the market?"

According to a United States patent a method of making fatty food products consists in partially hydrogenating unsaturated compounds of vegetable or animal oils and fats, by any process and arresting the operation at a predetermined point short of saturation and where the consistency of the product is above or below that of a given oil or fatty body an unhydrogenated oil or fatty body to produce a product of the desired consistency and having the characteristic flavour desired. For example, purified cotton seed oil is hydrogenated until the action reaches a point where the stearine produced amounts to about 22 per cent.

of the oil treated, there remaining about 80 per cent. of unsaturated oil. These proportions may vary with wide limits, depending on the consistency of the final product desired and the nature of the subsequent additions. To the hydrogenated product freed from catalyzer oily lard is added, preferably by means of incorporating rolls, the quantity being sufficient to give to the hydrogenated product a lard consistency.

The process is stated to be equally applicable to making butter substitutes and the like.

Preparing Copper and Zinc Alloys.

1170. D. R. B., Amraoti.—Requires hints for making copper and zinc alloys.

Copper and zinc can be melted together in the desired proportion either in a crucible or in a reverberatory furnace. A crucible furnace is generally a rectangular chamber 12 to 16 inches square and 3 to 4 feet deep, lined inside with fire brick, and connected near the top with a chimney by means of a flue, which is generally horizontal as the part adjoining the furnace, then inclining upwards into the chimney. This is specially the case when several furnaces open into one chimney. The proper construction of the furnace and disposition of the flues is a matter of the first importance, as a light difference in the arrangement of the flues will considerably affect the

draught and prevent the attainment of that high temperature necessary in melting copper, brass, bronze and similar metals. The section of the flue has a great influence on the working of a furnace, for if too narrow the friction will be great and the draught too sluggish. For an active and strong draught the flue must be wide and the chimney large and high. The section of the flue should be from one-sixth to one-fourth that of the fire-place.

Re-inking Type-writer Ribbon.

928. J. R. R. Delhi.—Requires hints for re-inking type-writer ribbons.

In two ounces or more of any ordinary writing fluid put a spoonful of thick gum arabic mucilage and a teaspoonful of brown sugar, warm the mixture, and immerse the ribbon long enough to become well saturated. When dry, spread the ribbon on a board and brush it well with glycerine. Should there be too much "colour" in the ribbon, press it out, between papers, with a warm flat iron; or if too dry, brush it again with glycerine.

Decorating Book Edges.

851. I. P. Rangoon.—Asks how book edges are decorated.

The edges of a book may be decorated in a variety of ways. The fore-edge may be fanned out and painted in any device in water colour and afterwards gilded, the painting will only show when the book is open. The fore-edge for this must be cut quite solid, and if the paper is at all absorbent, must be sized with vellum size before being painted.

The paint used must be simple water colour and the edge must not be touched with the hand before gilding as if there is any grease or finger-mark on it, the gold will not stick evenly. Painting on the fore-edge should only be attempted when the paper of the book is thin and of good quality. More common methods of decorating edges are by marbling and sprinkling but they are both inferior, to plain colouring. Some pleasant effects are sometimes obtained by marbling edges and then gilding over the marbling.

The edges of a book are nearly always finished off in some way or another, as the plain white edges would quickly become soiled. In small book binding shops the edge is most usually sprinkled. A small brush with a handle is dipped into a very thin coloured liquid and rubbed over a fine sieve which is fixed in a frame. The sieve is kept at sufficient distance from the edges of the book to allow the little drops of colour to fall like a fine rain. For this work the book is screwed up in the press. As a sprinkling colour, nutwood stain thinned with water is used, or indigo carmine, Prussian blue, etc., all well diluted with water, with the addition of a little paste and borax or a few drops of dilute carbolic to prevent the paste turning sour, aniline dyes have a common appearance.

A few variations are made in sprinkled edges by scattering damp saw dust, sand, or bran on the edges before sprinkling, thus producing coarser kind of sprinkling. Similarly rice, barley, even starch or drops of wax are used.

For the production of even marbling the use of an edge-marbling roller has come into vogue. One or two rubber rollers together with the automatic colouring rollers bearing aniline dye mixed with glycerine, are made up into a handy contrivance by means of which smooth coloured edges can be rolled over. These edges are passable only when carefully and skilfully executed; as a rule they look coarse and common. Marbling rollers can be used for comb marbling as well as for small veined marbling.

Zinc Oxide.

869. K. S. S. Tenkasi.- Wants to know the process of manufacturing Zinc Oxide.

The raw materials for the manufacture of zinc are derived from the ores of zinc. The crushed ore is intimately mixed with fine anthracite and charged in special furnaces upon perforated grate bars. These furnaces are built on the plan of a fire box and are provided with an undergrate blast.

The furnace chamber is closed during operation and is opened only during the process of charging. These furnaces are placed back to back in "blocks" and each block discharges the products of combustion and the oxide fume into sheet iron flues which convey them into the collecting system.* While charging and discharging a damper over the furnace is kept closed to prevent contamination of the oxide in the collecting system. The furnace gases are drawn through the flues by a suction fan placed in the line between the furnaces and the collecting

system, the fan serving also to deliver the gases and fume into the latter. The oxide together with the gases from the furnace, in their passage to the collecting system are thoroughly cooled, a sufficient length of flue being provided for that purpose.

The collecting system consists of a series of bags suspended vertically from a system of horizontal pipes, which are connected to the flue already referred to. Their mesh is such that it readily permits the escape of the gases, but retains the oxide. From these bags the latter is removed from time to time, properly graded, bolted through silk-bolting cloth and packed by machinery into barrels.

Preparation of Vegetable Waxes.

1192 L. A. S. D. Colombo.- Wants to know how vegetable waxes are prepared.

The processes in vogue for the preparation of vegetable waxes are closely analogous in general character. In the case of Chinese wax, the insect producing the wax is a species of *Coccus*, the young brood of which adheres to and punctures the bark and twigs of the trees on which it dwells. A waxy material is secreted covering the bark, in which the insects ultimately unbed themselves forming chrysalides. To obtain the wax, the branches are scraped, some of the cocoons being reserved for breeding, the rearing of the insects being a special industry, like silk growing; the scrapings are heated with boiling water so as to melt off the waxy matter, which is separated by skimming from the dirt, dead insects, etc.

The different kinds of vegetable wax (myrtle wax, Japan wax, Carnauba wax, etc.) are, for the most part, obtained in a similar manner by treating with boiling water the berries, bark, etc., in or on which the material is naturally secreted or deposited, and separately the melted wax as it rises. Bees' combs, etc., are similarly treated to obtain beeswax, and separate it from adherent honey and solid impurities.

Wood Composition for Moulding.

1183 P. T. G. Karachi.—Wants recipes of wood paste for moulding.

1. A simple recipe is to mix common resin with linseed oil, and boil it until a thick syrup results. Sifted saw dust is added to make a workable paste, and the moulds are subjected to the pressure of a screw press. This turns out very clean articles, and the product is not very liable to shrink.

2. A cheap compound is made up of

Liquid glue	20 parts.
Sifted saw dust	20 „
White Lead	6 „
Litharge	1 „
Plaster of Paris	2 „
Whiting	1 „

The saw dust is allowed to mix slowly in the glue and the litharge and white-lead added, and finally the plaster of Paris and whiting. A light composition which sets very hard and is white in colour is the result, and can be used in any kind of mould or dies.

Fine Machine Oil.

1201 P. T. R. S., Madras.—Desires to manufacture fine machine oil.

Ten parts of rape oil are warmed along with 5 parts of 90 per cent. spirit until the latter begins to boil, the whole being kept stirred. When ebullition of the spirit sets in, the heating is discontinued and the liquid is poured into a large flask of clear glass in which it is exposed to sun light until thoroughly bleached.

Varnish for Bamboo.

894 S. C. D. Itakhola.—Wants a recipe of varnish for bamboo and the process of polishing umbrella handles.

A solution of 3 oz. of white shellac in 10 fluid ounce of methylated spirit makes a transparent varnish suitable for bamboo articles.

Polishing Umbrella Handles.

Umbrella handles polished with solution of orange shellac and bleached shellac do not give a hard surface. Simple solution of shellac applied on pads, and cleared out by spirit, yield a surface similar to French polished goods, but care should be taken that each pad is worked out fairly dry and that no more oil than is absolutely necessary is used to enable the solution to work freely. Commercially, the sticks are handled in large quantities, and are generally worked up by a different process. Shellac solutions are simply used to act as a drier to enable the dyes or other colouring matter to be evenly distributed, and as a size to prevent the after-coatings of oil varnish sinking in. After the stocks have been coloured up as required, a good hard drying oil varnish is laid on; the

sticks are then set aside to allow the varnish to harden thoroughly. Some handles may require two or three applications of varnish. One coat must be allowed to harden before putting on the next. The rough garish appearance is then removed by rubbing down with fine grade pumice powder, and the rotten stone and oil applied by hand with flannel cloth.

Oxy-Acetyline Welding.

999 R. K. Ajal—Requests us to explain the principles of oxy-acetyline welding.

Welding is understood generally to mean the uniting of two pieces of iron or steel by heating them to the temperature at which they become softened or pasty, without melting them, placing them together, and by hammering or in some other way, bringing them into intimate contact. As is well known, this cannot be done with any of the common metals except wrought iron or steel. The process of fusing and uniting metals by the application of intense heat from a gas flame without compression or hammering is generally known as "autogenous welding." The temperature required is obtained by the combustion of a gas containing carbon or hydrogen, or both by the aid of pure oxygen. Acetyline is the gas generally used, although hydrogen is also employed. The gases are thoroughly mixed in a torch or blow pipe to insure perfect combustion, which takes place at the nozzle or tip. A modification of the welding torch is also utilized for the cutting of iron and steel by heating and burning away the metal by oxidizing it.

In oxy-acetyline welding the weld may be formed directly between the two adjoining surfaces, but, more commonly,

it is formed by fusing in additional material between the surfaces of the joint. This material is in the form of a rod or wire and may or may not be of the same composition as the material being welded. The principles involved in the use of the apparatus of different makes are practically the same, the differences being mainly in the construction of the torches and the manner in which the gases are generated. Oxygen and acetyline are most generally used, although oxygen and hydrogen are also employed, especially in metal cutting. The oxy-acetyline welding process is used both in the manufacture of articles, the parts of which would otherwise be reveted or joined by other means and in repair work.

Ink Powder.

100 A. S. R. S. K., Jodhpur.—Wants a recipe for ink powder.

	By Parts.
Gallnut Powder	42
Ferrous Sulphate	30
Gum	15
Alum	6

The gallnuts are ground fine together with the alum. The gum and the sulphate are powdered separately and then mixed with the rest. The powder is at once packed or bottled. The ink made by adding this powder to water gives a black sediment, from which it must be decanted.

If, however, it is desired to make the ink powder entirely soluble, the following process may be adopted.

Infuse the galls with water, evaporate the solution to dryness, and grind up the residue with the other ingredients. The object of the alum in the recipe is to prevent moulding. If it is replaced by boric or salicylic acid the acid chosen need only be about one-tenth per cent. of the powder.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Commercial India** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

926. J. P. & Sons, Jhansi.—Creosote may be bought of B. K. Paul & Co., 1, Bonfields Lane, and Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square; both of Calcutta. Hindi equivalent of caustic soda lye is not known. Treacle is "gurh." In the procedure read water in place of matter.

930. M. S. & Co., Camp Karachi.—Formulas of liquid hair dye appeared in June 1924 issue in page 139. Recipes of powder hair dye will be found in January 1925 issue in page 471. Process of preparing hair dyes in tablet will appear in an early issue. Recipes of hair oil appeared in December 1924 issue.

931. K. R., Simla.—Ear drum may be supplied by B. K. Paul & Co., 1, Bonfields Lane, Calcutta.

932. C. R. J. Shikarpur.—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. The firm may also indent tag making machine on your behalf. You may correspond direct with the firm for terms etc.

933. R. Muttiah, 1, Hugh Low Street, Ipoh, Perak, F. M. S.—Small refrigerator may be supplied by The Lightfoot Refrigeration Co., Ltd., 133, Belliaghata Main Road, Calcutta.

935. V. T. J. Parvatipuram.—Wants pigeons of Homer, Pouter, Lahore and Lucknow golas and Sharajji breeds.

936. H. R. B. & Sons, Gorakhpur.—Wants to buy mother-of-pearl. As mother-of-pearl is available in the Dacca side in large quantities the button industry has grown in those quarters. There are also other favourable circumstances leading to the growth of button industry in Dacca and Mahesi. Button making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. For import figures of button write to the Director of Commercial Intelligence, 1, Council House Street, Calcutta.

941. K. N. Tanuku.—Buttons may be supplied by Automatic Button Co., Muscatine, Indiana; Hawkeye Pearl Button Co., Muscatine, Indiana, New Jersey Button Works, New York; New Jersey and Morley Button Mfg. Co., Boston, Massachusetts; all of U. S. A.

943. K. B. B. Calicut.—Cardboard boxes are manufactured by Kundu & Das, 20, Gour Laha Street and H. L. Sett & Sons, 8, Nilmoney Mitter Street; both of Calcutta. You may correspond with the Registrar, The International Correspondence Schools Ltd., Elphinstone Bldg., Mirzban Road, Fort, Bombay.

944. Y. S. R. N. Razole.—Kashmir Kusum may be bought of B. Shaw, 46, Neemoo Gosain Lane, Beadon Square, Calcutta.

945. M. F. Guntur.—Cigarette making machines may be supplied by the United Cigarette Machine Co., Inc., Lynchburg, Virginia, U. S. A.

947. J. N. Delhi.—Refer your query to Emigration Officer, Delhi.

948. M. Q. R. & Co., Madhupur.—Biri leaves may be had of B. B. Pande & Sons, Katni. Biri tobacco may be had of Moolji Sicka & Co., 51, Ezra Street and Chunilal Purushottamdas, 128, Lower Chitpur Road; both of Calcutta.

950. A. N. D. Balasore.—Match making machines may be supplied by Bhawani Engineering & Trading Co., 122/1, Upper Chitpore Road and Bengal Small Industries Co., 91, Durga Charan Mitter Street; both of Calcutta. Any soft wood of straight fibre will be suitable for match making. For small oil extracting machines enquire of T. E. Thomson & Co., 9, Esplanade East and Burn & Co., Hongkong House, Council House Street; both of Calcutta. For further particulars write direct to the above firms.

951. B. K. O. Tamluk.—Bone powder may be had of S. Curlender & Co., 8, Old Court

House Corner; Calcutta Manure Works, 1, Royal Exchange Place and Katni Manure Works, 17, Amratola Lane; all of Calcutta

952 K & Bros Faizpur—Peppermint crystals may be had of B. K. Paul & Co., 1, Bonfields Lane, Calcutta. Cigarettes are manufactured by Imperial Tobacco Co. Ltd., 5, Fairlie Place and Great Eastern Tobacco Co. Ltd., Canning Street, both of Calcutta. Confectioneries are manufactured by Dr. D. Weller & Co., 43, Bow Bazar Street, Calcutta. Matches are manufactured by Bande Mataram Match Factory, Tallygunge, Sunderban Match Works, 12, Dalhousie Square and Udadanea Match Factory, Canal East Lane, Udadanga, all of Calcutta.

953 J. F. D. Myingyan—For litharge apply to Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Oil is not extracted from Litharge.

954 G. K. K. Dhamangaon—For learning soap industry you may correspond with Rigen Soap Works, 10, Kinnu Sircar Garden Lane, Khooroot, Howrah. You may also try to manufacture soap according to the direction given in formulas published in **Industry**. A good formula of washing soap appeared in January 1926 issue.

956 O. D. F. Stalkot City—For a list of industrial books write to Thacker Spink & Co., 3, Esplanade East and Chakraverty Chatterjee & Co. Ltd., 15, College Square, both of Calcutta.

957 D. S. S. Rawalpindi—It is not possible to make blocks without designs, hence before making blocks collect necessary designs. Ready made labels of required designs cannot be had.

958 S. D. Lahore—The machine required may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

959 D. S. Bareilly—For wool spinning machine enquire of H. M. Mehta, 123, Esplanade Road, Fort, Bombay.

961. K. N. M. Calcutta—The process of refining vegetable oils consists in treating the oil with animal charcoal in the proportion of four to one by weight. Animal Charcoal should be finely ground before it is

mixed to the crude oil. The whole is put in glass or china jars and covered over with a lid and is then exposed to the rays of the sun for 15 days successively. Impurities are absorbed by the charcoal and in filtering refined oil is obtained.

962 M. C. G. C. Mirzapur—For books on tailoring write to Thacker Spink & Co., 3 Esplanade East, Calcutta.

963 A. K. A. K. Ennakulam—Candle making apparatuses may be supplied by Calcutta Industries Ltd., 136-37, Manicktola Main Road, Calcutta.

965 M. L. C. Muttra—The following is a list of homeopathic journals in India. The Indian Homeopathic Review, 203/1, Cornwallis Street, Calcutta. The Modern Science, 53 Hewett Road, Allahabad. The Indian Homeopathic Reporter, 48 Chaulpati Road, Bhawanipur, Calcutta and the Homeopathic Director, 42/10, Doctor Lane, Calcutta.

966 D. S. G. Sangor—For rubber stamp making outfits you may enquire of B. N. Bysack 1/1 Ram Chand Ghose's Lane, P. O. Beadon Street, Calcutta.

967 K. C. S. Almora—Thank you for your kind suggestion.

968 P. N. Chikacole—We do not deal in any articles, we only give necessary information to our constituents. Stationery articles and Stephen's ink may be had of Nilmoney Halder

Kaminia Oil

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Finest dressing for the Hair. Delicately perfumed. Re. 1/- per bot. charges extra.

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Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot. of $\frac{1}{2}$ ounce Rs. 2/-, $\frac{1}{4}$ ounce Re. 1/4/-, V. P. & Packing extra.

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& Co., 106 Radha Bazar Street, Calcutta. Papers may be bought of Ghose Bros, 63-J Radhabazar Street, and Bhola Nath Dutt & Co, Old China Bazar Street, both of Calcutta. Glass plates may be bought of Hem Chandra Chandra, 13 Swallow Lane and Behary Lall Dey, 14 Swallow Lane, both of Calcutta.

969 A D A. Smila.—For speedy disposal of goods you deal in advertise widely.

970 A R K B Renala.—For prosecuting your studies and practical training for sugar industry in Java write to The Director of Industries of your province.

971 S A S C, Narsingpur.—Answers to your queries appeared in March and May 1926 issues under No. 3515 and No. 273 respectively where you will find the addresses you require. Mirrors may be had of Behary Lall Dey, 14 Swallow Lane, Calcutta. Glass bangles are imported by F P Nalladaroo & Co 50/1, Canning Street and S Abdul Aziz, 52, Canning Street; both of Calcutta. Crochet cotton balls may be had of E B Bros & Co, 11, Dharamtola Street, Calcutta. This firm also imports wool.

972 K D Calcutta.—Chemicals may be bought of B K Paul & Co, 1, Bonfields Lane, Calcutta. As regards caustic soda lye prepare it at home according to the strength and consistency given in the formula. Wants to buy black treacle. As regards working cost first prepare on a small scale and calculate the actual expenses.

973 C C Bros, Chalkhoa.—For disposing of ivory you may correspond with the following ivory goods workers: Ghosh Dastidar & Co, 125, Bow Bazar Street, Calcutta, Matri Bhandar, 206, Cornwallis Street, Calcutta, Madras General Agency, Post Box No. 538,

Madras; P M Aalabuksh & Co., Ajmer Gate, Jaipur and Keercsalangam & Sons, Vizagapatam. It is very difficult to say which firm of foreign countries require ivory, so please advertise for securing foreign buyers.

974 A C M V Lyallpur.—Process of preparing greases appeared in the last issue. Palm oil and other oils may be supplied by B. K. Paul & Co, 1, Bonfields Lane, Calcutta. For King's bells enquire of S N Bhattacharjee, 5, Dharamtola St Calcutta and Wellington Cycle & Motor Co, 313, Hornby Road, Fort, Bombay. Your other enquiries appeared in the last issue.

977 R D P., Almora.—For training in electrical and mechanical engineering you may write to The Principal, Bengal Engineering College, Shibpur, Howrah. You may also write to the Loco Superintendents of various railways. Process of preparing electric batteries appeared in November 1925 issue.

978 M N S Sons, Madura.—Sulphuric acid may be had of D Waldie & Co, 1, British Indian Street, B K Paul & Co, 1, Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square; all of Calcutta.

980 R P K Dharwar.—Refer to No. 825 under Brief Queries & Replies columns in the last issue.

981 D R M R Co, Jullundur.—Sandal soap is manufactured by Calcutta Soap Works Ltd, 65, College Square, Calcutta. Cigars are manufactured by M Subbaya Pillai, Trivandrum and Satyanarayana Cigar Works, Penugonda, Krishna. Address of Indian match manufacturers appears elsewhere in these columns. Button covering machines may be supplied by Defiance Button Machine Co, 43/47, West 11th Street, New York, U. S. A. Rubber goods may be supplied by Acme Rubber Mfg. Co, Trenton, New Jersey; Cincinnati Rubber Mfg Co, Cincinnati, Ohio and New York Rubber Co, New York, all of U. S. A. The following firms deal in peacock's feather. The Indian Trading Co., Jaipur and Sri Ram Kamath & Co., 1, McLean Street, George Town, Madras. For doing registration work read some books on the subject that may

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be bought of Thacker Spink & Co., 3 Esplanade East, Calcutta. You will find a list of produce brokers of United Kingdom interested in Indian produce in February 1926 issue of **Commercial India** the sister journal to **Industry**.

982 S. M. A. & Son, Nagina.—X'mas cards are published by Regent Publishing Co. Ltd, 318, Euston Road, London N. W 1, Tuck Raphael & Sons Ltd, Raphael House, Moorfield, London E. C. 2; Philco Publishing Co., 4 Holborn Place, London, W. C. 1. and Photochem G m b H Stolpischestrass 37, Berlin, Germany. Want to be introduced to importers of Moradabad brasswares in U. S. A., Canada, Australia and New Zealand.

983 I. D. Fatah Ganj.—Capsules may be had of B. K. Paul & Co., 1 Bonfields Lane, and P. S. Dutt & Bros. 8 Ezra Street; both of Calcutta. Animal charcoal may be had of R. C. Gupta & Co., 34 Clive Street, Calcutta. Alkanet root is a kind of vegetable root used for colouring hair oils.

984 T. B. B. Monghyr.—For "Musoorial" decorticating machines write to T. E. Thomson & Co., 9 Esplanade East and Burn & Co., Hongkong House, Council House Street; both of Calcutta explaining your requirements. For steam paddy drier enquire of Marshall Sons & Co. Ltd., 99 Clive Street, Calcutta. Electric dynamos, etc., may be had of Alfred Herberts 13 British Indian Street, Calcutta.

985 S. S. P. Raghunathpur.—Fancy goods may be supplied by Pacific Novelty Co., 41-E, 11th Street, New York, U. S. A.; Adachi T. N. Kaisha, 43 Nishimachi, Kobe, Japan; Loewe E. Fantavella, 17 Barcelona, Spain; Smith Bros & Co. Ltd, 64-70, Great College Street, London, N. W 1; Jacob Son & Co., 28 & 29 London Wall, London E. C. 2; British Bazars Ltd, Market Street, New Castle-on-Tyne, England; Magersohn David, Wilsdruffeestrass 21, Dresden, Germany; A. B. Bergeton Pederson, Christiania 17, Norway; M. & H. Brener, Fagerhomstrasse 2, Leipzig, Germany and C. E. Ganger, Alter Steenweg 40, Hamburg, Germany. Various kinds of cloths may be bought of Jaharlal Pannalal & Co., 134, Canning Street, Calcutta. Laces and thread balls may be sup-

plied by E. B. Bros. & Co., 11, Dharamtola Street, Calcutta. Bottle phials and corks may be had of Satya Charan Paul, 194 Old China Bazar Street, Calcutta and S. K. Dey, 124 Shova Bazar Street, Calcutta. Jewelleries and gold and silver ornaments may be bought of Ghosh & Sons, 16/1, Radha Bazar Street; B. Sirkar & Sons, 131 Bowbazar Street and Benud Behary Dutt, Bentinck Street; all of Calcutta. Gramophones harmoniums, etc musical instruments may be had of M. L. Shaw, 5/1, Dharamtola Street, Calcutta. Aluminium utensils may be had of Jewan Lal & Co., 55 Canning Street, Calcutta. Ottos may be had of Khoda Buksh & Co., 7 Colootola Street, Calcutta. Zarda may be bought of Badal Ram Lachminarayan & Co., Harrison Road and Mahammed Mustafa Hossain, 240 Raya Katra, Barabazar, Calcutta. For label printing write to Calcutta Fine Art Cottage, 71 Dharamtola Street, Calcutta. Locks and safes may be bought of Ghosh & Co., 42/1, Lockgate Road, Cossipur, Calcutta and Bengal Iron Safe & Lock Works, 129 Shova Bazar Street, Calcutta. All other addresses you require will be found elsewhere in these columns.

986 T. G. N. Palghat.—A good formula of washing soap appeared in January 1926 issue.

987 M. G. N. Cochin.—Collapsible tubes may be had of Venesta Ltd., 1, Great Tower Street, London E. C. 3 and Brooks Peel & Co. Ltd, 24 City Road, London, E. C. 1.

988 S. B. W. Srinagar.—The following are some of the important woollen mills of India:



**Cheapest House For
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Rs. 3/12/- each.

**Largest Stock & Variety
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**CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

Indian Woolen Mills Ltd., Lahiri Mansions, Sandhurst Road, Bombay; Kaiser-i-Hind Woolen Mills, Cawnpore and Dharamsi Morarji Woollen Mills Ltd., Sudama House, Sprott Road, Ballard Estate, Bombay.

989 D. M. N. P. Dindigul.—For German make sewing machines enquire of Indo German Trading Co., 6 Dalhousie Square, Calcutta.

990 B. R. Ferozepur City.—Enzymes contained in many seeds readily and spontaneously hydrolyse fats at ordinary temperatures into free fatty acids and glycerol. It is stated that the enzyme 'lipase' contained in 10 kilos of crushed castor seed which has been extracted with castor oil, is able to decompose 1000 kilos of fats and oils in twenty-four hours at ordinary temperatures. The fats are stated to yield excellent light coloured soaps. The process is however the subject matter of chemical research.

991 V. E. S. Sind.—The following are some of the prominent jewellers of Calcutta. Ghosh & Sons, 161, Radha Bazar Street; B. Sirkar & Sons, 131, Bowbazar Street; Benud Behary Dutt, 1-A, Bentinck Street, and Ghosh Bros, 114 College Street.

992 M. R. I. Salem.—Rosin oil may be bought of B. K. Paul & Co., 1 Bonfields Lane, Calcutta. For quince seeds try Banshidhar Dutt & Sons, 126 Khengraputty, Barabazar and Jadu Nath Ghar, Hukkaputty, Bara Bazar; both of Calcutta.

993 J & Co, Kottayam.—A formula of fountain pen ink appeared in August 1924 issue.

994. G. S. M. C. Alleppey.—For exporting matting you may correspond with Joseph Wild & Co, New York and Little Falls Fibre Co, Little Falls, New York; both of U. S. A.

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K. M. DAS & CO,
29/1, Telepara, Sampooker St., Calcutta.

995 K. Brothers, Lahore.—Process of preparing naphthaline appeared in December 1921 issue. Pill making machines may be had of Oriental Machinery Supply Agency Ltd., 20/1, Lalbazar Street, Calcutta.

998 V. P. K. Travancore.—Reply to your queries appeared in the last issue under No. 598.

999 R. T. Aijal.—Wants to buy secondhand iron bedstead, table lamp, type-writer, portable and simplex and mattress. Try to be an apprentice.

1000 M. G. A. Masar Road.—For appliances used for polishing sealing wax enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lal Bazar Street, Calcutta. Students reading below the matriculation or school final standard are not admitted in a government medical college or school.

1001 J. S. A. Sialkot City.—Socks, handkerchief, neckties, etc., may be bought of E. B. Bros & Co, 11, Dharantola Street, Calcutta. Toys may be bought of K. B. Nan, 233, Old China Bazar Street, and The Pioneer Toy Mart, 234 Old China Bazar Street; both of Calcutta. China wares may be had of Nandalal Das & Bros, 194 Old China Bazar Street, Calcutta. Lanterns may be had of G. T. Racek & Co, 111, Radha Bazar Street, Calcutta.

1002 M. S. M. W. Madras.—Slates are manufactured by Ambler's Slate & Stone Co, Ltd., 12 Dalhousie Square, Calcutta.

1003 V. D. Tanuku.—Walking sticks may be supplied by Dutt & Co, 221, Upper Circular Road and Das Biswas & Co, 42 Dharamtola Street, both of Calcutta. Cycles on wholesale terms may be supplied by Dutt Dass & Co, Mercantile Bldgs, Lal Bazar; Standard Cycle and Motor Co, 43/1-D, Dharamtola St and M. L. Shaha 5/1, Dharamtola Street; all of Calcutta.

1004. T. A. Bezwada.—A formula of toilet soap appeared in April 1925 issue. For preparing brown soap use bismark brown which may be bought of Amin Chand Mehra & Sons, 34 Armenian Street, Calcutta.

1008 M. B. K Mandalay.—Typewriter ribbon may be had of Town Typewriter Co, 2 British Indian Street, Calcutta.

1010 R S J Delhi.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd., 2011, Lall Bazar Street, Calcutta Agency Ltd., 2011, Aall Bazar Street, Calcutta and Calcutta Industries Ltd, 136-37, Manicktola Main Road, Calcutta

1012 R L K Sargodha.—For industrial books enquire of Thacker Spink & Co, 3 Esplanade East and Chackraverty Chatterjee & Co Ltd, 15 College Square; both of Calcutta For learning cutting and tailoring write to Calcutta Commercial Institute, College Street Market, Calcutta Can supply material for artificial silk collected from all parts The following are some of the prominent photographers of Calcutta Artistic Photographer, 644, Beadon Street, Photo Atelier, 16, Bentinck St, Beadon Studio, 146, Upper Chitpore Road and Lewis & Co, 12 Waterloo Street

1013 C C D Nadiad.—Reply to your enquiries appeared in the last issue under No 773 in Brief Queries columns

1014 K V Bapatla.—Your previous queries have already been replied

1015 K V Buldana.—You will have to fix the dye using proper mordant before printing on cloth Alum will serve your purpose

1016 K C Schore.—For analysis write to Dr. Ghose's Laboratory, 5 Coopers Lane, Calcutta. For securing partner advertise in the pages of newspapers and periodicals

1019 A C M W Lyallpur.—The best thing for you will be to engage an expert who will supply you with necessary information

1022 B S Co, Agra.—Mats and sitalpati of Bengal may be bought of National Stores, 29111, Mirzapur Street, Calcutta Your other enquiries are in the nature of an advertisement, so these should not be published in these columns

1024 R D Dumraon.—Process of preparing depilatory used for removing hairs permanently is not known For this you may try our subscriber Shafai Khizab Office, Ludhiana No. 3.

1026 H. B. Attarikhah.—Stationery articles may be had of Nilmoney Halder & Co., 106 Radhabazar Street; Dass & Co, 60 Sikdar Bagan Street; F N. Gupta & Co., 13 Belljaghata Road, and Bengali Miscellany Ltd, 99 Manicktola Main Road; all of Calcutta.

1027 J. C G Jessore.—Match making machines may be had of Bhawani Engineering & Trading Co, 12211, Upper Circular Road and Bengal Small Industries Co, 91, Durgacharan Mitter Street, both of Calcutta Rice husking machineries may be supplied by Marshall Sons & Co Ltd, 99 Clive Street, and Macbeth Bros Ltd, 2 & 3, Hare Street; both of Calcutta. Wheat grinding and oil milling machines may be had of T F Thomson, 9 Esplanade East, Calcutta and Bunn & Co, Hongkong House, Council House Street, Calcutta It will be advisable for you to come down to Calcutta and order the machines required after being satisfied with the working demonstration As regards installation cost and working capital the above firms will supply every detailed information.

1029 B R B Bogula.—Your enquiry being in the nature of an advertisement should not be published in these columns

1030 T N Bhuvanavaram.—Cycles may be bought of Wellington Cycle & Motor Co., 313, Hornby Road, Fort, Cycle Exchange & General Stores, 41, Meadows Street and Lamington Cycle & Motor Co, Cawasji Patel Street; all of Bombay For electric fans enquire of Balmer

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Write for full particulars to Sole Agents—for India, Ceylon, etc.

K. B. JOSHI & CO.,

321, Hornby Road, Fort, Bombay,
Post Box No. 534.

Calcutta—81A, Clive St.,
Post Box No. 675.

Karachi—Bunder Road,
Post Box No. 230.

Madras—Post Box No. 1260.

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices.

Lawrie & Co., 15, Oak Lane and Premier Electric Co., 327, Horny Road; both of Bombay.

1031 M. T. Zing, *k—For sex indicator enquire of K. G. Mani, * 5511, Canning Street, Calcutta. Bee keeping appliances may be supplied by E. Palmer & Co., Simla. There is also an association at Simla under the name of Bee Keepers' Association. You may go through Hints on Bee Keeping by C. C. Ghosh, to be had of Superintendent, Govt. Printing, Rangoon, Burma. Beeswax, crude wax, etc., may be supplied by N. Lyngdoh, Bara Bazar, Assam.

1032 C. C. Bros. Chalkhoa—Blankets may be supplied by Kartic Chandra Bhakat, 13, Karrya Bazar Road, Calcutta; Mysore Agency, 39/6, Sukea Street, Calcutta; B. P. Gupta & Sons, Gaya, and Blanket Pure Woollen Factory, Gaya.

1033 M. L. B. Bundi—Rosin should be mixed with tallow or other fatty matters as a filling agent of soap.

1035 S. C. B. Balasore—An article on preparation of floral ottos will be found in April 1926 issue of *Industry*.

1036 N. L. D. Bombay—Your enquiry is engaging our attention.

1037 K. L. P. Nakarbad—For the chatka required enquire of Indo-German Trading Co., 6, Dalhousie Square, Calcutta.

1038 A. M. Kottayam—It is advisable for you to consult World's Directory.

1039 T. K. J. R. Tanjore—Indigo is exported by Morgan & Co., 2, Mango Lane, Calcutta; J. Thomas & Co., 8, Mission Lane, Calcutta; M. M. Ispahani & Sons, 51, Ezra Street, Calcutta and Girdharilal Radhakissendass, Baibhai Mohalla, Bombay. Nuxvomica is exported by the above firms. Industrial and Trade Review for Asia of Germany has been proscribed by the India Government.

1041 B. N. M. Purnea—Sock knitting machines may be supplied by Indo-Swiss Trading Co., 27, Pollock Street, and Economic Mills Ltd., 50/2, Dharantola Street; both of Calcutta. Rs. 100/- will be required for starting a

knitting factory besides machines and other allied expenses.

1042 H. R. B. & Sons, Gorakhpur.—The suitable place for starting button manufacture will be the locality where labour is always available and cheap at the same time. There should be facilities for railway or other communication. Further if pearl, nuts and other button making materials be available in large quantities in the vicinity of the factory it will be counted as an additional advantage for starting a button factory. For pearl enquire of Kantilal Sarupchand Nanavati, Dhanni Street, A. B. Mehta & Co., 311, Shroff Bazar and Manilal Sinajual & Co., Dhanni Street, all of Bombay. Want an expert in button making.

1043 K. K. Mahras—We can not agree to your proposal. You may write to Gillanders, Arbuthnot & Co., Gillander House, Clive Street, Calcutta.

1044 A. P. S. Rewa—For the machine required enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

1045 S. R. M. Maymyo—For the duplicator required write to Nilmoney Halder & Co., 106, Radha Babar Street, Calcutta.

1046 A. N. S. A. Bangalore—Cigarettes are manufactured by Imperial Tobacco Co. Ltd., 5, Fairlie Place, Calcutta and Great Eastern Tobacco Co. Ltd., Canning Street, Calcutta.

1048 D. L. M. & Co., Gaya—United Kingdom and Canada have trade commissioners while other foreign countries have consul generals in India who look after the commercial and political interest of their respective countries. To facilitate the foreign trade of India High Commissioner of India's Office has been established in London at Grosvenor Garden. The following addresses will be of some importance to you: His Majesty's Trade Commissioner, 11, Clive Street, Calcutta, Consul General for Germany, 2, Store Road, Ballygunge, Calcutta; Consul General for Japan, 7, Loudon Street, Calcutta and Trade Commissioner for America, Grosvenor House, 21, Old Court House Street, Calcutta.

1049. H. H. Allahabad.—An article on biri making appeared in May 1925 issue. Tobacco leaves and biri leaves may be supplied by Moolji Sicka & Co., 51, Ezra Street and Chunilal Purushottamdas, 128, Lower Chitpur Road; all of Calcutta. Glass beads may be supplied by Aminchand Mehra & Sons, 34, Armenian Street, Calcutta.

1050. R. D. Darbhanga.—After going through a few issues of *Industry* select some of the industries you wish to launch upon, when we shall be able to discuss the merits and demerits of business individually.

1052. N. P. P. Alleppey.—Process of manufacturing soap similar to sunlight soap appeared in August 1921 issue. A formula of bar soap will be found in November 1925 issue. Your other enquiry is unintelligible.

1053. A. L. S. Araria.—Thread balling machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. For pill making and grinding machines enquire of the above firms. Yarns may be supplied by Sukdeo Ram Misra, 2/12, Cross Street, Calcutta.

1057. R. B. Bombay.—Wants to be put in touch with Kossa silk manufacturers of Assam and Central Provinces and Berar.

1058. R. L. B. Ludhiana.—Elaborate articles on match industry appeared in July 1922 and September 1923 issue of *Industry* where you will get everything necessary in detail. Match splints and veneers may be supplied by Sunderban Match Works, 12, Dalhousie Square; Bandemataram Match Factory, Tallygunge and Bhawani Engineering and Trading Co., 122/1, Upper Circular Road; all of Calcutta.

1059. S. S. A. N. Srivaikuntam.—Oil extracted from sandal wood is known as sandal oil. Tamil equivalent of sandal wood is "Sandanak-Kattai." Essential oils are derived from the vegetable kingdom and found in almost every part of the majority of the plants which produce them.

1060. S. V. R. R. Cocanada.—Refer your query to the Director of Agriculture of your province.

1062. D. B. Dacca.—You may use black Japan. The following is the recipe of a good Japan for metal surfaces: Take 12 ounces of amber and 20 ounces of asphaltum. Fuse by heat and add $\frac{1}{2}$ pint boiled linseed oil and 2 ounces of rosin. When cooling add 16 ounces of oil of turpentine.

1063. R. P. S. Patna City.—For opening mail order business you may go through "Money Making by Mail" by Mr. K. M. Banerjee to be had of Industry Book Dept. There is no firm known to us that helps to buy houses on small premiums.

1064. M. W. Co. Nurnahal.—For coconut coir mattings enquire of D' Cruz & Sons, Pallivarutti, Cochin; Volkart Bros, Hydraulic Coir Press, Calicut and General Suppliers Agency, Post Box 16, Alleppey. Carpets are manufactured by Oriental Carpet Manufacturing Co, Amritsar; East India Carpet Co., Hakimian Gate, Amritsar; Shah Ali Mian Carpet Factory, Alampur, Raichur, Hyderabad and Agra Carpet Factory, Agra.

1067. K. L. Sitaram.—For botanical chart enquire of Butterworth & Co., 8, Hastings Street, Calcutta. For models try School Book Supply Co., 309, Bow Bazar Street, Calcutta.

1068. M. N. Kasimpur.—Process of storing potatoes appeared in June 1926 issue.

1069. R. C. S. Kharsia.—A serial article on Poultry Raising appeared in December 1924, January 1925 and February 1925 issues of *Industry* which you may consult with profit. There are practical suggestions also for conducting the business profitably. Rs. 300/- will be a very small sum for starting a poultry farm. As regards extending your firm you may take up dairy farming also side by side. An article on dairy farming appeared in the last issue and this issue deals exhaustively with the cattle problem of India—particularly with the economic value of cattle. For selling your product you will have to advertise in the pages of newspapers and periodicals.

1070. K. C. L. Khurda.—Fountain pens are repaired by Hilton & Co., 109, College Street, Calcutta. Put some quantity of gum arabic in a little quantity of water when it will dissolve.

Venice turpentine may be bought of B. K. Paul & Co., 1, Bonfields Lane, Calcutta. Pictures may be bought of Bombay Fine Art Gallery, 69, Esplanade Road, Bombay and Dey & Co., 2-2 & 2-3, Corporation Street, Calcutta.

1072. G. N. B. Calcutta.—Bituminous waxes are not available in India. You may try the following foreign firms, Biery Oil Co., New York; Seydel Manufacturing Co., Jersey City, New Jersey and Sinclair Refining Co., Chicago, Illinois, all of U. S. A.

1073. G. S. Co. Yaval.—You may ask queries on industrial and technical subjects which we shall try our best to answer in the columns of our journal.

1074. R. R. G. Kaimganj.—Process of dyeing yarn appeared in August and September 1925 issues of **Industry** where you will get practical hints for dyeing with fast colour. Put your query regarding "Brahmi" to an Ayurvedic physician who is the best man for solving difficulties regarding indigenous herbs. Process of manufacturing toilet soap appeared in April 1925 issue while a good formula of washing soap will be found in January 1926 issue. Your other query is not in our line.

1075. S. T. Co., Jaipur.—Beeswax may be bought of N. Lyngdoh, Bara Bazar, Shillong, Assam, A. Razak Khan, Jubbulpore and Madhab Chandra Daw, 4, Armenian Street, Calcutta.

1076. S. C. D. P. Saktipur.—Wants to be put in touch with "Ghi" and timber suppliers of Nepal.

1077. C. J. H. Sholapur.—To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected.

1078. M. T. Nadiad.—Artificial "hing" is prepared by dissolving $\frac{1}{2}$ oz. of asafetida in 2 pints of pure sheep's milk and setting apart the mixture in a new earthenware vessel to ripen. When fermentation is complete remove the scum and dry it. The product is a good substitute for "hing." Your other ideas are not workable.

1080. N. C. P. Baroda.—For spare time work go through New Idea columns of a few

back volumes of **Industry** where you will get some practicable suggestions to be worked out with a small capital.

1081. S. G. Jaipur City.—Enamelled jewellery may be had of Mangal Deb Dhanpat Rai & Co., Multan City. Colours may be supplied by Aninchand Mehra & Sons, 34, Armenian Street, and Hansraj Vishram, 13, David Joseph Lane, both of Calcutta. Soaps may be bought of M. Framrose & Co., Mainshaw's Bldg., 25, Bank Street, Fort, Bombay. Cigarettes of various brands may be bought of Karim Bux & Elahie Bux Bros, 58½, Canning Street, Calcutta. Ivory articles may be supplied by Mattu Bhandal, 206, Cornwallis Street, Calcutta. P. M. Alabukshi & Co., Amer Gate, Jaipur and Mahadeo Khatadi, Chandpole Gate, Jaipur City. Fancy goods of brass may be supplied by Anwar & Co., Shahi Masjid, Benarshi Das Parshottam Das, Ornamental Brassware Mfg Co., Nai Basti and Shamlal Raghunath Saran, Sahi Masjid; all of Moradabad, U. P.

1082. M. R. D. Sialkot City.—Wants to be put in touch with suppliers of mother-of-pearl shells and ivory.

1083. A. C. C. Mawpore.—For preparing syrup direct from fruits, consult Syrup Manufacture published from this office.

1084. R. I. W. Wazirabad.—Casein is manufactured by G. Ramaswamy Naidu, Krishnarajandra Dairy Farm, Doddaballpur, Bangalore. Celluloid sheet is imported by Jessore Comb & Button Factory, Jessore, Bengal.

1085. R. R. Co. Patur.—An illustrated article on flour milling industry showing clearly the working principle of machinery appeared in August 1925 issue. Machineries may be supplied by Burn & Co., Hongkong House,

MAKE TRANSPARENT ENVELOPES

"Temperol" Varnish applied with brush makes any Envelope Transparent. Also gives a film like surface to Posters and Pictures for night advertisement. No need to paint on glass. Price Tin 1 Pint with Stencil & Brush Rs. 2/- each. V.P. charges Extra. Agents Wanted to sell our other specialities.

THE ENGINEERING SPECIALTY CO.,
P.O. Box 120, Bombay.

Council House Street, and Marshall Sons & Co., Ltd, 99, Clive Street, both of Calcutta. The above firms will supply you with estimates and other allied information you may require. Industrial books may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta. Confectionery machines may be supplied by Seth Deepchand & Co., Sukkur, Sind. Tin boxes may be supplied by Gajanand Rampratap, 6, Halsi Bagan Road, Calcutta. Cardboard boxes may be had of Bengal Cardboard Box Mfg Co., 64/1, Mechua Bazar Street, Calcutta and H. L. Sett & Sons, 8, Nilmoney Mitter Street, Calcutta.

1086. V. S. P. Cocanada—For printing type cast enquire of American Type Founders Co., Jersey and Schodel & Lombard Stamp & Die Co., New York, both of U. S. A. For printing types also you may write to the firms for your requirements.

1087. V. C. W. Nizamabad—For jeweller's rouge enquire of A. J. Soor & Co., Bagh Bazar, Calcutta. Process of preparing jeweller's rouge appeared in January 1922 issue of **Industry**.

1088. N. C. Bombay—For pulverising aluminium and nickel you may use a sort of metal grinding machine, for which write to T. E. Thomson & Co., 9, Esplanade East, Calcutta and Burn & Co., Hongkong House, Council House Street, Calcutta.

1089. L. W. C. Karachi—It is not possible to erase printing on a watch dial and to print other matter on the same. Casein dissolved in silicate of soda or potassium, makes a very strong cement for glass. Your other enquiries are receiving our attention.

1090. K. B. Salur—For industrial books write to Chakravartty Chatterjee & Co., 15, College Square, and Thacker Spink & Co., 3, Esplanade East; both of Calcutta. Wants

addresses of journals on magic. Recipes of sherbet will be found, in April 1925 issue. Broken glasses are utilised in preparing inferior quality of glass. Process of preparing ink tablet will be found in July 1925 issue. The same issue also contains recipes of stencil ink. Recipes of essential oil will be found in March 1926 issue. Recipes published in the booklet Manufacture of Hair Oils are selected ones.

1091. S. K. Bombay—Chaulmugra oil is obtained like other vegetable oils by hydraulic pressure.

1092. N. S. R. Bros, Rajahmundry—Wants to be introduced to catechu manufacturers of Bombay.

1093. G. L. V. Udaipur—Wants to be put in touch with second-hand machinery suppliers of U. P., Punjab and Bombay.

1095. C. N. Lantkynew—Plaster of Paris may be bought of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

1099. R. V. L. Loitheline—Threads of all sorts may be supplied by E. B. Bros & Co., 11 Dharamtola Street, Calcutta. Needles may also be supplied by the above firm. For selling sock and stockings advertise in the pages of newspapers and periodicals.

1100. K. J. R., Godhra—Process of softening rubber will appear in an early issue.

1101. C. H. S. Ahmedabad—Recipes of ice cream appeared in the last issue.

1102. S. S. T. Fatehgarh—All enquiry letters received in this office are serially numbered.

1103. A. G. Akyab—A mixture of 2 drams boracic acid with 3 drams common salt of which an addition of 2 to 3 drams to 1 gal. of milk is said to increase its keeping qualities for twenty-four hours.

1105. R. Muttiah, 1, Hugh Lane Street, Ipoh, Perak, F.M.S.—Crown corks may be supplied by N. W. Mitchell & Sons Ltd., 2, Dod Street, Lime House, London E. 14. Corking machines may also be supplied by the above firm.

PURE SILK CHADERS

3 Yd. x 54" Rs. 7/- Very soft, light, durable for years, Indian made suitable for all seasons. Same with fancy silk embroidery for Ladies Rs. 10/- Silk suit piece Rs. 8/- shirting fine silk for 3 shirts, Rs. 10/-.

SWADESHI UDYOG BHAWAN, Muttra U.P.

1106. J. N. Jalpaiguri.—For telephone directories enquire of respective telephone corporations.

1109. M. A. Rai-Bareilly.—Betelnuts, cloves, etc. spices may be bought of Madhab Chandra Daw 4, Armenian Street and Bansidhar Dutt & Co., 126, Khenraputty, Bara Bazar; both of Calcutta. For selling "ghee" you may communicate with Mahanando Dutt, 62, Strand Road and Durga Charan Rakshit & Co., Cotton Street; both of Calcutta.

1110. T. S. M. Ilavapuram.—Further particulars of the mystic plant are not known.

1112. K. S. R. Ramachandrapuram.—For vulcanizing machines enquire of Burn & Co., Hongkong House, Council House Street, Calcutta. Wants to buy rubber.

1113. P. C. N. Allahabad.—For repairing aluminium ware you may try with aluminium solder, manufacturing process of which appeared in December 1925 issue. Repairing enamelled vessel is not possible.

1114. A. B. Rutlam.—Good teas may be supplied by Mukherjee Brothers 17-19, Sham Bazar Bridge Road, Paul & Co., 108, Cornwallis Street and Bhattacharjee & Co., Ltd., 1, Swallow Lane; all of Calcutta. Sweet flavour emitted by teas is due to skilful blending, the process of which will be found in July 1925 issue.

1115. P. K. Madras.—It is not possible to solidify "Ghee" except by lowering the temperature.

1116. B. M. Kashiore.—Boric acid may be prepared from borax, the process of which appeared in October 1923 issue of *Industry*. Cardboard boxes may be bought of L. B. Verma, Cawnpore, and Bengal Cardboard Box Manufacturing Co., 641, Machua Bazar Street, Calcutta. For the tin caps enquire of P. S. Dutt & Bros., 8, Ezra Street, Calcutta.

1117. M. R. B. Hubli.—If the brand selected by you is not registered you may use the same brand and have it registered duly, otherwise not. For information enquire of Patent Office, 1, Council House Street, Calcutta.

1118. T. D. Delhi.—We cannot undertake to dispose of your shares of the joint stock com-

panies referred to by you. We only furnish information to our constituents. Wants an expert in syrup manufacture and pickle preparing.

1119. S. Co., Morar.—For second-hand printing machines enquire of A. Lall & Son, 15, Boloram Bose's 2nd Lane, Puddapukur Rd., Bhawanipur, Calcutta.

1121. S. N. B. Agra.—For books on tailoring enquire of Chakraverty Chatterjee & Co., Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East, both of Calcutta.

1122. J. H. Cochin.—The process of refining coconut oil consists in treating the oil with animal charcoal in the proportion of four to one by weight. Animal charcoal should be finely ground before it is mixed to the crude oil. The whole is put in glass or china jars and covered over with a lid and is then exposed to the rays of the sun for 15 days successively. Impurities are absorbed by the charcoal and on filtering refined oil is obtained. For cleaning coconut oil barrels wash with washing soda.

1126. B. C. R. Ajmer.—Your previous queries have already been replied. You may use aniline dyes for colouring soap.

1127. P. I. M. B. Batu, Kalumpung Estate Tanjong Malin, Selangor, F. M. S.—For hair oil manufacture you may go through the instructional booklet *Hair Oil Manufacture* published from this office. Process of preparing bar soap appeared in November 1925 issue.

1129. M. B. L. Aligarh.—Process of preparing washing soap with coconut appeared in January 1926 issue.

1130. D. N. Tumkur.—For patent registration write to P. Lodge & Co., P. O. Box No. 6772, Calcutta.

BOSE & COMPANY

General Order Supplier & Dealers In:

All sorts of Canes, Bamboo Root Polo Balls & Raw Products & etc. The best house for placing orders. If you are in need of anything please to book your order with,

BOSE & COMPANY,

23 Ram Rattan Bose Lane, Shambazar, Calcutta.

1131 M. D. B Mhow.—Pearlash is prepared by calcining crude potashes on a reveratory hearth, dissolving the calcined mass in water, and after repose, decanting the clear solution and evaporating it to dryness in flat iron pans, the product being constantly stirred towards the end to reduce it to a semi-granular state. Although purer, its richness in absolute alkali is less than that of the potashes from which it is prepared, being only from 37 per cent. to 51 per cent. While bathing you may use toilet soap, a recipe of which will be found in April 1925 issue of *Industry*.

1132. S. K. S. Basurhat.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street and Calcutta Industries Ltd., 136-37, Manicktola Main Road; both of Calcutta. The above firms will also supply you with the necessary information

1133 V. A. Kandy.—For anhydrous sulphuric acid try Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square and D. Walde & Co, 1, British Indian Street; both of Calcutta. Fill rubber balloons with hydrogen gas.

1134. H. S. Shimoga.—Refer your query to the Finance Member to the Mysore State

1135 J. P. R. Dinajpur.—You may use rosin as an adulterant to your soap, it will increase the solubility in water and lathering properties and detergent power of the soap. You may also use silicate of soda which will increase detergent properties very highly. It improves the glossiness of the soap. It is important that the soap to be silicated should have a distinct caustic taste, or the resultant soap is liable to become like stone with age. A good formula of washing soap appeared in January 1926 issue.

1136. A. G. A. Bombay.—Recipes of perfumes, face powder, face cream, etc., will be found in July and September 1924 issues of *Industry*. Recipes of hair oils will be found in December 1924 issue.

1137 S. B. S. Bhatinda.—Oil fans may be bought of Bengal Chemical & Pharmaceutical Works Ltd, 15, College Square, Calcutta.

1139 M. P. R. Hoshangabad.—Process of preparing agarbatties appeared in May 1924 issue.

1140 S. J. S. Cawnpore Cantt.—Formulas, recipes and ideas for starting small business appear regularly in the columns of *Industry*.

1141. S. M. H. Patna City.—For books enquire of S. C. Addy & Co, Wellington Street, Calcutta.

1144. S. R. R. Mellur.—For knitting machines enquire of Indo-German Trading Co., 11, Dalhousie Square and W. H. Brady & Co, 26, Strand Road; both of Calcutta

1145 F. S. C. Chiklapur.—For books on cinema films enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta. For cinema machines enquire of J. F. Madan & Co, Ltd, 5, Dharamtola Street; Calcutta Camera House, 158, Dharamtola Street and Calcutta Photographic Stores & Agency, 154, Dharamtola Street; all of Calcutta.

1146 S. M. P. Rangamati.—For mango and orange grafts enquire of Nurjehan Nursery, 2, Kankurgachi Lane, Calcutta. For particulars of F. R. H. S. communicate with the Secretary, Royal Horticultural Society Vincent Square, Westminster, London. Boots and tennis shoes may be bought of Young & Co, 56, Bentinck Street and Hall & Anderson Ltd, 31, Chowringhee Road; both of Calcutta.

1147. S. M. Dacca.—Recipes of hair oils will be found in December 1924 issue.

1150 D. G. Saugor.—For particulars of goods mentioned by you write direct to the advertisers.

1152. C. B. G. Sanalkhas.—Proper steps have been taken according to your letter.

1153. M. F. H. Moradabad.—Refer your query to the American Trade Commissioner,

Simply Grand, Safe & Sure
HAIR REMOVING CREAM
Removes Hair within $\frac{1}{2}$ mt.
ABSOLUTELY HARMLESS & SOOTHING.
 Price As. -12/- Per Tube.
AURORA INDUSTRIALS,
 72 Canning St., Calcutta.

OHO

Grosvenor House, 21 Old Court House Street, Calcutta and Consul General for Germany, 2, Shore Road, Ballygunge, Calcutta.

1154. G. R. L. N. R. Erode.—For learning various technological subjects you may correspond with the Principal, School of Chemical Technology, Neogi Pooker Lane, Calcutta.

1155. D. M. S. C. Madras.—For disposing of your snuff you may correspond with Bhattacharjee & Co., Ltd, 64, Cornwallis Street and Sarma Banerjee & Co., 43, Strand Road; both of Calcutta, whether they are willing to stock your goods. The best means for you will be to secure some agents in different localities who will push for speedy sale of your goods.

1156. C. A. Jammu.—Piece-goods may be supplied by Hamel & Honley Ltd., Lancaster House, Princess Street and Hiltermann Bros, 56, Whitworth Street; both of Manchester. It will be advisable for you to consult some experts. In the beginning you should go through some books on the subjects mentioned by you. Books may be bought of Thacker Spink & Co., 3, Esplanade East and Chakraverty Chatterjee & Co., Ltd, 15, College Square; both of Calcutta.

1157. K. S. K. S. L. Gujrat.—Vernacular equivalents of chemicals used are not available. For the chemicals you may try B. K. Paul & Co., 3, Bonfields Lane and D. Waldie & Co., 1, British Indian Street; both of Calcutta. Process of making vinegar at cheap cost appeared in October 1925 issue of *Industry*. Recipes of hair dyes will be found in January 1925 issue. Recipes of hair oils appeared in December 1924 issue of *Industry*.

1160. R. G. N. G. Ponda.—"Attars" may be bought of D. G. Gore & Co, 31, Mangal Dass Road, Bombay.

1161. G. S. M. C. Alleppey.—The office of the International Trade Developer is at Grosvenor House, 21, Old Court House Street, Calcutta. Wants to be put in touch with importers of coir mats and matting in U. S. A. and Great Britain.

1162. J. C. A. Srinagar.—Electroplating appliances may be supplied by T. E. Thomson & Co., 9, Esplanade East, Calcutta. Stopped

phials may be bought of C. K. Dass & Co., 17, College Street, Calcutta. To start any business you will have to pay trade license fees.

1164. R. S. Ilayangudi.—Cinema machines may be bought of J. F. Madan & Co, Ltd, 5, Dharamtola Street and Calcutta Camera House, 158, Dharamtola Street; both of Calcutta. Process of preparing ice at home appeared in April 1925 issue. For securing agents put an advertisement in the Sale & Exchange pages of *Industry*.

1165. V. D. R. Jamshedpur.—For books on mechanical engineering enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta.

1166. B. A. Dhuha.—Process of refilling dry cell battery appeared in March 1924 issue. Take expert advice.

1169. D. R. L. Bhcia.—You should use soft wood of straight fibre for manufacturing pencils and penholders. For wood arrange with Government Forest Department for regular supply.

1172. C. J. Surat.—Formula of removing hair permanently is not known. However you may try our advertiser Shafai Khizab Office, Ludhiana 3, Punjab, for such hair oil. An article on electroplating appeared in November 1923 issue. You may consult Ubersee Post, 10, Solomonstrasse, Leipzig, Germany, Export & Import Review, 38-39, Krausenstrasse, Berlin Germany and Swiss Exporter, Berne, Switzerland. Blocks are prepared by Calcutta Fine Art Printing Syndicate, 147, Baranosi Ghose Street; The Photographic Stores & Agency Co., 154, Dharamtola Street and U. Roy & Sons, Garpar Road, all of Calcutta. To prevent pitting from small pox take salicylic acid 6 drs; thymol 2 drs; eucalyptol 4 drs; menthol 2 drs. and groundnut oil 1 lb. Mix them thoroughly and besmear all over the body.

ACCOUNTANCY

London Diploma Examination In December
TUITION FREE BY POST

Apply Prospectus.

PAITHANKAR,

POST JUNNAR, (Poona).

NOTICES AND REVIEWS.

Tooth Powder.

We have received a sample packet of Kalnar Tooth Powder from Messrs T S S Suriya & Co, New Municipal Bldgs, Big Bazar Street, Manuargudi

School Badges.

Nice and attractive celluloid lockets with suitable inscriptions are made by Mr A R Quershi, Ahmed Lodge, Gujrat, Punjab. These may serve as school badges, volunteer decorations, etc

Hair Dye.

"Khizab-i-Rashide" is the name of a hair dye to restore the natural colour of grey or white colour. It is prepared by Mr A R Quershi, Ahmed Lodge, Gujrat, Punjab

Ringworm Ointment.

Messrs Thakre Brothers, Proprietors, Shree Vainganga Agency, Bhandara, C P have sent us a bottle of ringworm ointment. Our readers may give it a trial

A Stationery Novelty.

The Magic writing pad is a stationery novelty. One can write upon it without pen or pencil. It may be had of German Agency, 110, Kalla Street, Trichinopoly.

A New System of Typography.

In the pages of a leaflet entitled the New Andhra Printing Type, Mr V P Padmanabharaju, B. A. & D. O., Cocanada, has suggested some simplifications in Telugu typography.

Magazine for Story.

The Indian Story Teller. Editor, Jatindra Mohan Sanyal, 164, Cornwallis St., Calcutta. Annual subscription Rs. 3/- only.

As its name implies it is a monthly magazine for story and wit. Fiction written in simple language will surely appeal to those who like light literature in leisure hours.

Nut Crackers.

Nut crackers etc are handy domestic utensils of every day use. Messrs Chhatbar Trading Co, Jamnagar, Kathiawar, specialise in their manufacture. Our readers will find the product serviceable

An Industrial Magazine.

Work Published by Kanaiyalal V. Thakkar & Co, Nanbha St, Bhavnagar, India

It contains instructive articles on trade and industry and a number of manufacturing formulas

A Literary Magazine.

Excelsior Published from Dehra Dun. Annual subscription Rs 4/- only

This monthly magazine is devoted to cultural advancement and discussion of all topics of interest. The articles are well written and instructive

Magazine for the Young.

The Torchlight Editor, Mr C S Narayana Rao, M A Office at Hornby House, Hornby Road, Bombay

Described as a magazine for the young— young in age and young in spirit—the watchword of this journal is "Life, Light, Love." The contributions are very interesting and carefully selected.

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College

USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers

Factory—Baranagar and Barisal,

Office—113, 114, Khangrapotty St., Calcutta.

A Book on Practical Economics.

A scheme of Economic Development for Young India By Prof. Benoy Kumar Sarkar To be had of The Oriental Library, 25½, Cornwallis St., Calcutta.

The author is an Indian economist of vast erudition and great distinction and as such his thoughtful opinion deserves the serious consideration of all who are interested in the economic uplift of India. His suggestions are put forth in a concise form and are eminently feasible. He has reviewed his theme from all possible stand-points and naturally the survey is comprehensive.

A Trade Directory.

The Standard Indian Commercial Directory Published by the Standard Publicity Co., Railway Road, Lahore.

We congratulate the compilers of this extremely useful directory in which many notable features are discernible. We mention a few items at random: list of motor car owners, addresses of Indian merchants and manufacturers; classified trade index; foreign directory, tariff schedules; exchange tables, etc etc. As a handy reference book the directory will prove invaluable to the commercial public.

The Nature Healer.

Published from 20½, Kaliprasad Chakravarty St., Baghbazar, Calcutta.

A glimpse into the contents of this valuable journal will convince the reader of the efficacy of naturopathy. The subject matter traverses a wide range, as will be apparent from some of the articles named here, "Unity of Diseases and Treatments, Various Uses of Water, Drugless Cure of Diseases, Curing Child Stammerers, etc etc. Altogether the magazine is not only helpful but also healthful.

LUMINOUS PAINT AT LAST!

Professor Printer, after years of patient research work, has the pleasure of introducing this novel paint, which shines in the dark, to the public. This paint can be most advantageously used for making a thing or part of it visible in the darkness, such as letters on a signboard, figures, and hands of a clock, watch, or time piece, electric switches, key holes, holy writings targets, etc. Mixed ready for immediate use. Even a child can apply it. A drop covers a large area. In two sizes. Half Ounce bottles Rs. 1/- each; One Ounce bottles Rs. 2/- each. Packing & Postage Extra. Agents Wanted.

PRINTERS CHEMICAL WORKS,
71 Montgomery Road, Lahore.

An Economic Journal.

"Arthik Unnati," or Economic Development, in Bengali Editor, Prof. Benoy Kumar Sarkar. Published at 107, Mechuabazar Street, Calcutta. Annual subscription Rs. 4/8/-.

The name of the editor who is a widely travelled journalist of international fame is warranty enough of the high standard in which the above monthly is to be conducted.

This excellent magazine is judiciously divided into several sections, viz., wealth of Bengal, manufacturing and commercial activities of India, economic development of the world and the like. The articles, written as they are by well-known experts, have permanent value, the notes have been pithily put down, and every thing is substantiated by facts and figures. In a word abstruse subjects have been brought within the purview of popular intelligence.

We wish a long lease of life to this useful journal, the utility of which in the economic development of Bengal cannot be too greatly emphasised. It merits a liberal patronage.

A Book of Confectionery.

Bengal Sweets By Mrs. J. Halder. Published by Messrs. Chakravarty Chatterjee & Co., 15½, College Square, Calcutta. Price Rs. 2/8/- only.

In the midst of all other provinces of India the confectionery of Bengal stands matchless. It comprises innumerable varieties—all toothsome and dainty. The book has been written in a thoroughly scientific manner. In the introductory portion the use of utensils, the choice of ingredients, the methods of cooking, etc have been elaborately dealt with. The recipes, of which there are over 100, are all tried and tested while the copious details and hints given make their preparation an easy affair. Besides there are numerous illustrations from photos. The get-up is attractive. The book will assist in popularising the sweets for which Bengal is justly famous in other parts of India.

Quite incidentally we would suggest how one can make one's livelihood with the help of this book. Now-a-days a demand has been created in foreign countries, notably in Britain and America, for the sweetmeats of this country. If some venturesome Indian can start a shop in the cosmopolitan cities of the West the dainty confections of Bengal will sell like hot cakes.

A CORRECTION.

The advertisement that appeared on Page 90 in the May issue about the match machineries and factory is meant for people to earn Rs. 1000/- monthly and not Rs. 100/- as printed there.

Trade Enquiries.

[To communicate with any party write him direct with name and address as given below, mentioning Industry.]

1094 P Das Gupta, Gangajalghati, Bankura—Wants to buy Gulkond, pauri, aguru, musk and all sorts of tobacco leaves.

1097 Tarabhushan Banerjee, Vakil, Monhyr.—Wants an active partner with Rs. 40,000 capital to invest in a running rice mill.

1127 P M B Raju, Kalumpung Estate, Tanjong Malin, Selangor, F. M. S.—Wants an expert in hard bar soap making and hair oil making

1151 P Lakshminarayan Kaimam, Ballipadu, Ralanq, W Godavari—Can supply used postage stamp

1167 Durga Das Mehta, Contractor, Srinagar, Kashmir—Desires to be put in touch with exporters of uncured furskins

1221 Mohd Abul Khair H P. Sirya, Kotnajibullah, Hazara—Wants to be put in touch with bone merchants

1224 Basant Kumar Jain, Srinagar, Garhwal—Wants a loan of Rs. 500 to invest in a profitable business

1292 A P. Kodaisia, Bansda, Sura—Wants to be introduced to suppliers of fibre extracting machines and purchasers of banana powder

1328 N. L. Dutt, 26, Bangla Bazar, Dacca—Desires to work as an organising secretary or representative in East Bengal and Assam for first class firms.

1338 J. H. 22/11, Jeliatola Street, Calcutta—A noted cinema expert, the only Indian trained in a cinema company of America, wants a capitalist to start a cinema industry with educational films. Huge profit Minimum capital required Rs. 60,000.

1345 S. K. D. Dalal, C/o Grahams Trading Co., Ltd., McLeod Road, Karachi—Wants tiger's fat.

1356 S. S. Bhattacharjee, Santipur, Bengal.—Wants a capitalist partner to establish an astrological institute in India

1374 R. D'Silva, Kayadi, Konoor, Kankandady, S. Kanara—Wants to be put in touch with purchasers of cashew nut shell from places near Mangalore.

1379 Banaveri Brothers & Co., 85 Sarai Hakeem, Aligarh.—Want matting fibre in very large quantities

1380 N. Sen Gupta, Shillong Road, Gauhati, Assam—Wants to sell bones of an elephant Intending buyers may correspond direct

1381 N. V. R. Kameswar Row & Bros., Pedapatnam, Nagaram, Godavary—Can supply best quality ghee, til oil and fresh limes.

1431 V. K. Somasundarain Pillai, 11, Victoria Street, Tuticorin—Can supply sheep fur.

AUGUST ISSUE OF INDUSTRY

(In The Press.)

The August issue of **Industry** will contain illustrated articles on Buck Manufacture, Tile Making, etc. besides the regular features such as New Ideas, Small Trades and the like. In addition there will be Formulas, Processes, Queries and Replies. Any friend of our subscriber will have a copy free on application to the Manager, **Industry**.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows:—

Indian Rs. 3/- Foreign Rs. 5/4/-

The charge is for complete yearly volume only, inclusive of postage. V. P. and Registration fees are separately charged

BUSINESS NOTICE.

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

Manager **INDUSTRY** OFFICE,
Shambazar, Calcutta.

CHEAPEST

ALONE IS NOT WHAT YOU WANT;
Yours is a Manufacturing concern,
necessarily you want what is

CHEAPEST AND BEST

WE ARE DIRECT IMPORTERS
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FOR MANUFACTURING

SOAP, & MATCHES

FOR DYEING & TANNING,
AND ALL OTHER INDUSTRIAL
PURPOSES.

CHAMPAKLAL BROS.,
72 CANNING ST., CALCUTTA.

(A copy has been filed with the Registrar,
Joint Stock Company, Bengal)
**THE BENGAL MATCH FACTORY
& SAW MILLS LTD.,**

Head Office:—219, Bowbazar St., Calcutta.

Registered Capital:—Rs. 5,00,000 divided into
shares of Rs. 10 each payable Rs. 2 with application
Rs. 2 on allotment and the balance in two equal
instalments

Subscribed:—25,000

Paid up:—15,000

Board of Directors consists of best experts,
well known merchant, businessmen, Zemindars
and Banker. The company is being managed
under the strict supervision of directors. The
work of the company is also conducted under
the advice and instruction of an advisory Board.
Auditor—B Chowdhury, A C R. A (Glas-
gow) Government Authorised Auditor 19, Sha-
kharipara Road, Bhawanipur, Calcutta

No promotion money has been paid. No
contract has been entered into with any party.
The work is now in progress after thorough
reorganisation. Large production is necessary
to supply the great demand and to cope with
the foreign competition. To carry this out well
equipped and up to date machineries will soon
be fitted up and the shareholders are not to wait
long for the good return or their money invested.
Remaining shares are now available at par. To
avoid disappointment apply immediately for the
same. **Wanted energetic influential agents to
sell a limited number of shares.**

Particulars from Managing Director.

SEX BOOKS AND YOGA EXERCISES.

BY PROF. H. S. GAMBERS

1. Control over Birth (Illustrated)
gives harmless and infallible methods of
preventing conception. Acknowledged to
be the most practical book on the subject.
As. -12/-.

2. The Hidden Side of Sexual Science.
Gives full instructions about the most vital
question of married life. Contents too
confidential to be publicly advertised.
As. -12/-.

3. Four Easy Yoga Exercises (Ele-
mentary Pranayama and Muscle Control)
for curing all sexual troubles, bringing
best and passion under control and in-
creasing retentive power ten fold (Pre-
viously sold for Rupee One.) As. -6/-.

4. Three Easy Yoga Exercises (Breath-
ing & Nasal Donching) for curing cold,
cough, catarrh, headaches, giddiness and
phlegmatic diseases. As. -6/-.

5. Protection against Venereal diseases.
Gives simple precautionary measures of
avoiding venereal diseases under all cir-
cumstances. As. -4/-.

Rs. 2- only for the complete set,
POSTAGE EXTRA.

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K.C. BISWAS & CO.
GUN & RIFLE MAKERS

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EXISTS IN THE CIRCULATION OF
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THE MAGAZINE FOR TRADERS.

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Commerce Dept
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Many individuals in the industry seem to think that the most important aspect of their business is their advertising budget. By not writing off the A/E/C Department, the industry will undoubtedly write up their own advertisement and the industry can receive the materials. This service is free of any charge.

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INDUSTRY OFFICE
SHAMBAZAR : CALCUTTA.



INDUSTRY OFFICE:—Keshub Bhaban, Shambazar, Calcutta.

“Indeed your process is simple and so far as I have tried them they are most practical.

—writes one who is already preparing to put himself in the market with his Hair Oil.

YOU CAN FOLLOW HIM IN THE BIG EARNING FIELD OF

HAIR OIL MANUFACTURE.

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holds Good for 3 months
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will train you at home easily & quickly and enable you to commence earning immediately. These are given with complete secret instructions for **Rs. 4 only**, if you write immediately to send these by V P P

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HOW TO MAKE YOUR OWN SCENTED HAIR OIL AND SAVE MONEY.



WHY not make Scented Hair Oils of any Odour you like at your own Home at the Cheapest Cost and save money? Get 16 Ounces of Cocogem, Coconut, Groundnut or Sesame Oil and mix half ounce of any kind of Mohini Pure Scents, then you will have the Finest Scented Hair Oil at a Cheap Cost at your own home. Nothing to learn. Very easy to make.

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HIGHLY Concentrated Perfumes without Spirit or Alcohol. The Most Powerful Perfumes used for perfuming any kind of Oil for the Hair, Toilet Soaps, Toilet Powder, Tooth Powder, Handkerchief, Garments, etc., etc. If one or two drops are put into the handkerchief its sweet fragrance will last for several days.

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Champak Scent	3 oz	Rs	2 8	Bokul Scent	4 oz	R	2 0
Khas	" "		2 8	Hena	" "		2 0
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Kadamba	" "		2 0	Sweet	" "		1 0
Jasmin	" "		2 0	Mixed	" "		0 8

PACKING POSTAGE AND V.P. COMMISSION EXTRA.

Write for Free Booklet The Art of Perfumery
it is sent gratis and post free.

*It explains How to make Scented Hair Oils, Spirit Perfumes, etc.
at Home at a Cheap Cost. How to perfume Soaps, Snuff, etc., etc.*

S. PAUL & Co., Manufacturing Perfumers,
(DEPT. IND.) 4, HOSPITAL STREET, DHARAMTOLA, CALCUTTA.



VOL. XVII.

CALCUTTA, AUGUST, 1926.

NO. 197.

INDUSTRY AND NATURAL RESOURCES.

WHAT is the most vital factor to a country's well-being—its store of natural resources or the cultural efforts of its people? Nature contributes its quota to the production of wealth by yielding up its power, forces, and raw materials; man by giving his labour, his machine, and his implements, his inventions and discoveries. Which means the most—the generosity of Nature or the ability of Man?

The question is old. It is almost as old as the science concerned with the economic life of the human race known as Political Economy. In our reading of the history of commerce in Europe the answer to it has varied from time to time. There was a time—the commercially flourishing 17th century—when the answer was that a country was rich or poor according to its abundance or lack of precious metals, of silver and gold. Then there came a time—the period of growth of the "physiocratic" school of thought in 18th century—when the answer was that the earth alone can give new values, that a people is rich or poor in proportion to the magnitude of natural resources at its disposal. And there appeared finally a man—the renowned economist, Adam Smith—who said that

the things which contribute most to the wealth of a nation are industry, organising ability and economy of its people.

What is now the answer given to the question in our time? To the commercialists we assert that money is one thing, wealth another, that a moderate amount of gold is useful as a foundation for our monetary system, while a superfluity thereof brings no benefit. With the physiocrats we hold that, given two peoples of equal ability, where one is endowed with a greater wealth of natural resources, that one may expect to enjoy the greater measure of success. We seem to have a case in point in the greater success achieved by the Europeans in the United States—that land over flowing with rich natural resources than in Europe itself. We concur with Adam Smith when he says that in any one country, the most able and industrious people will achieve more than the others. This view would appear to be confirmed by the attainments of certain nationalists in young colonies overseas. Nature stands on equality with Man, Man with Nature; even as each half of a pair of scissors—both alike indispensable—Nature's gifts and Man's labour and saving meet in production.

FODDER CROPS.

THERE are at least five or six characters all or nearly all of which must be possessed together if a crop is really to be of value to a farmer as a special fodder crop to which he is expected to devote any considerable portion of his land. Such is the opinion of Dr. Harold Mann who summarised the characteristics in a Government Bulletin on the Fodder Crops of Western India.

1 The crops must be palatable, digestible and not injurious to the animals which are expected to eat them. The palatability is generally connected with a leafy character, and with succulence of stems and leaves. A large amount of fibre means a less satisfactory fodder and hence one has to consider very closely the stage at which a crop should be harvested if it is designed as a fodder crop. Many, among the most usual fodder crops, rapidly increase their content of fibre after a certain stage in their growth, and what was a good fodder before becomes a very inferior one later. Many grasses may be cited as examples. When they flower they are excellent. When they ripen they are barely worth the cost of harvesting. Rice straw is after the rice has been reaped an exceedingly poor fodder so is wheat straw. And yet in earlier stage these are excellent feed. Again among our most common fodder crops, there are a number which in certain stages are injurious. This is particularly the case with nearly all our common jowars (sorghum). Before they flower, these plants are apt to produce hydrocyanic acid (pemssic acid) in the body of the animal,

more especially if a vigorous growth has been afterwards stunted by any cause whatever. And they are hence very dangerous at this stage. One must know in fact that a crop is palatable, digestible and non-injurious not only at some stage but at the stage at which it is proposed to use it.

2 A successful fodder crop must grow quickly so as to allow the land to be used for another crop or for another cutting of the same crop. In those parts of India where almost the rainy season is short, and where one can only extend the growing season by expensive irrigation, the necessity of a quick growing crop is particularly great. If it is to be grown on the rain it must be ready for cutting by the time the reliable rainfall will probably have ceased. If it is to be grown under irrigation, the cost of a single watering is so great that the necessity for an extra irrigation may mean all the difference between a considerable profit and little or no profit at all. When irrigation is available the fodder crop has to compete as an occupant of the land with other very valuable crops—and an extra thirty days in growing may mean that it will not pay as against these other crops.

3 Equally necessary is it that any proposed fodder crop should give a large yield of fodder per acre. Only a limited amount of good land can be devoted to fodder growing—and land which is not good is rarely satisfactory for most fodder crops and a maximum yield in a minimum of time is an essential thing. We have, luckily some fodder crops here which yield as well as any in the world;

many of those recommended and used in America or Australia give nothing like the quantity that some of our jowars or maize will produce per acre within 2 or 3 months. And though there may be occasions when a fine fodder which yields little will pay to grow, as a rule the maximum quantity obtainable per acre is a very factor in deciding on the crop.

4. A fodder crop is more likely to be successful if it does not need high manuring. As a rule, however, fodder crops grown intensively do need good manuring and well cultivated land—but if one crop or one rotation of crops needs less manure than another it is a vital factor in its success. Usually, however, fodder crops do need well tilled, well prepared, and well manured land. A great necessity for success in this direction is the recognition of this fact. Much has been talked recently about dairy farms which are likely to be, of course, largely fodder farms. These will only have even a probability of success if it is recognised that the growing of fodders represents a high type of intensive agriculture.

5. It is generally also very important that the crop chosen should be one which can be preserved without serious deterioration. A crop which can only be used as it grows or which deteriorates much if not used at once, is badly handicapped with another, even yielding less per acre, which can be preserved as hay or silage for the drier parts of the year.

A good fodder crop then (1) should be palatable digestible and non-injurious at the stage at which it is to be fed,

(2) should occupy the land, (for one crop) for as short a time as possible, more especially if grown under irrigation;

(3) should yield as large crop of fodder per acre as possible,

(4) should need as little high tillage and manuring as possible—even though good fodder crops as a rule do need fairly high tillage and manuring,

(5) should be capable of being preserved, generally as silage or hay, without serious deterioration.

Snake-Bite Cures.

IN India, there are some cures for snake bites known to a few who guard their secret so jealously, that up to the present day, no one has found them out, so that the public in general may benefit. Periodically some one writes about it in the papers, but nothing definite, that one may use. Boots and the little black button used by snake charmers are continually referred to, but what they are and how they may be obtained is never told. So far the writer has found only two cures easily procurable and whose natures are known. These two cures have been experimented with and found successful.

The common cure in Ceylon for the bite of venomous snakes is one or two cupsful of plantain tree juice. The core of one or two plantain trees is pressed out and given to the victim to drink. The taste is not pleasant, but the cure in 94 per cent of cases is said to be certain, if not given too late. It is also remarkable that snakes will not bite into plantain trees, and with the exception of the green snake, they are seldom to be found among plantain trees.

A hard black cake forms at the bottom of the "ganja" smoker's pipe, similar to the sake formed in a tobacco pipe. The cake is rubbed on a stone with water and the resulting dark brown fluid injected into the body. The treatment is simple and does not require a hypodermic syringe. An incision is made above the wound to find red blood and into this the dark brown fluid is rubbed. Sometimes four or five small incisions have to be made higher and further from the wound until red blood is found, the longer the time between the bite and the incision the further away from the wound the red blood will be found.

MANUFACTURE OF BRICKS.

BEFORE proceeding to start a brick making industry one should familiarise oneself with the qualities required in bricks for building purposes. These may be briefly enumerated—"Soundness, that is freedom from cracks and flaws, hardness, to enable them to withstand pressure and cross strain; regularity of shape, that the mortar by which they are united may be of uniform thickness to ensure uniformity of settlement; uniformity of size, that all the bricks in a course may be of the same height, uniformity of colour, which is of importance only in ornamental work; facility of cutting, to

enable the brick layer to cut them to any given shape, as required in executing all

kinds of gauged work; lastly, for furnace work and all situations exposed to intense heat, infusibility."

The judicious selection and preparation of the materials can alone ensure these qualities in bricks. The argillaceous earths suitable for brick making may be divided into three classes:—(1) Pure clays, consisting chiefly of one-third alumina and two-thirds silica, with small proportions of iron, lime, salt, magnesia, etc. (2) Marls, or natural mixture of clay and lime; (3) Loams, or natural mixtures of clay and sand. Brick earths, however, generally require some admixture. The pure clays require the addition of sand or loam, and the loams require the addition of lime to flux and bind the earth. Even when the clay requires no mixture, the difference in the working of two adjacent strata is often so great that it is advisable to mix two or three soils together to produce uniformity in the size and colour of the bricks.

Bricks for ordinary uses are known as "place-bricks," "grey and red stocks," "marl-facing bricks," and "cutting bricks." The place-bricks and stocks are the ordinary wall bricks. The marls are very superior bricks and used on the outside of buildings. The finest kind of marls and red bricks are called cutting bricks, and are used in arches over doors and windows being rubbed to a centre and gauged to a height.

The first process in brick making is the tempering of the clay. Great care is taken as the clay is being turned over and tempered with water, to remove

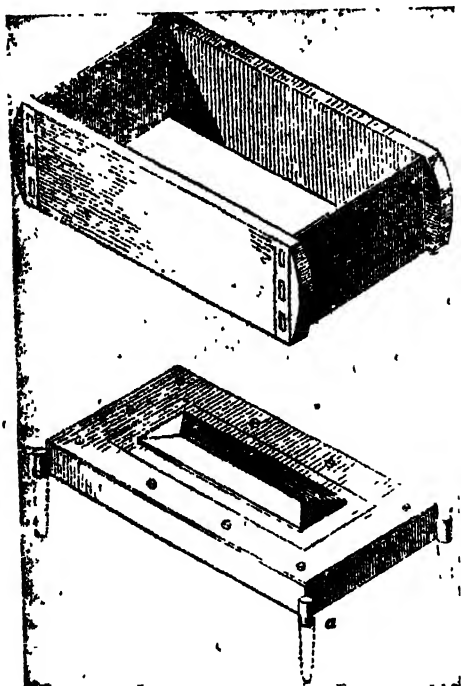


Fig. 1. Hand Mould.

enable the brick layer to cut them to any given shape, as required in executing all

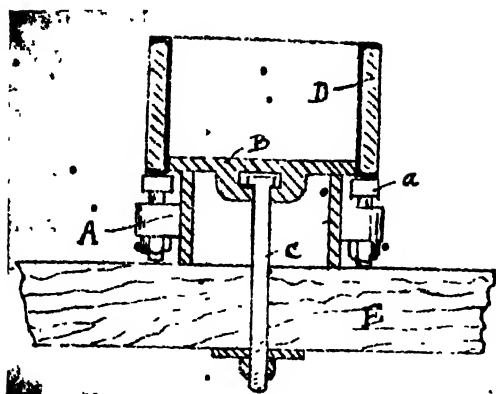


Fig. 2. Hand Press.

every stone that can be discovered in the plastic mass; for the presence of even a small pebble in a brick causes it to crack in drying.

For the better class bricks the clay is dug out, ground to a pulp at once in a wash mill, and mixed with chalk previously ground to the consistence of cream. This pulp is run off through gratings, and allowed to settle until it is firm enough for a man to walk upon it; it is then covered with finely sifted ashes, and allowed to mellow. Finally the ashes are thoroughly mixed with the clay and pugged in a pug-mill. This is a conical apparatus having the larger end upwards, with an upright revolving shaft passing through it, fitted with a number of knives, which cut and knead the clay, and force it through the mill, which is constantly filled at the top from the barrows of the work-people, while the clay continually issues from a hole in the bottom, where it is cut into convenient pieces and piles up for future use. The pug-mill is extensively used where the

demand for bricks is large, and where the brick-earth is favourable in quality.

When the clay has been reduced by one of these processes to the necessary state for brick-making, masses of it are successively brought to the moulter's bench. The mould is without top or bottom, and the workman's art consists in dashing a piece of clay with such force into it, as completely to fill it, and then cleverly striking off the superfluous quantity, and turning out the brick on a pallet, which is placed by an assistant on a hack barrow which when loaded is wheeled away to the hack-ground, where the bricks are built into long low walls to dry. By another plan, the bricks are shifted at once from the moulder's bench to a drying floor from thence to the hovel or drying shed, and from the hovel to the

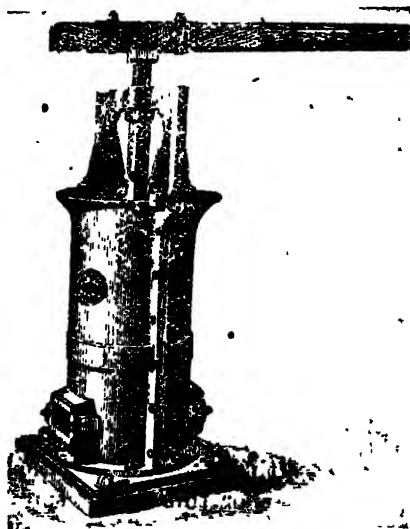


Fig. 3. Pug Mill.

The moulder is often provided with a trough for water as well as a heap of sand, the mould being either dipped in water, or sanded, between the making of each brick, that the clay may not adhere. If water is used, the process is commonly called *slop-moulding*, if sand, *pallet-moulding*. The moulds are generally of wood only; they are sometimes made of brass, cast in four pieces, and riveted together, or of wood lined with brass, sometimes of wood with the edges of iron, sometimes with the two longest sides of iron.

A suitable mould is made of sheet-iron in four pieces riveted at the angles, and strengthened with wood at the sides. The bottom is separate and is called a "stock-board." This is fastened by pins at the corners to the moulder's bench. It is very common to make

bricks with a hollow underneath; both for the sake of lightness, and to leave a bed for the mortar. This is managed by fastening piece of wood called a *kick* to the upper side of the stock-board. The mould being placed on the stock-board (which easily and accurately fits it) and the clay pressed into the mould, a hollow space corresponding to this kick is of course formed on the underside of the brick. The pallets are pieces of board $\frac{2}{3}$ ths of an inch thick, of the same width as the mould, but a little longer.

The bricks on one set of pallets are ranged on the hack-barrow, which has a flat top of light frame work, fit to receive two rows of bricks. Three of these barrows will be found useful one being constantly leading at the moulder's bench, another unloading in the drying

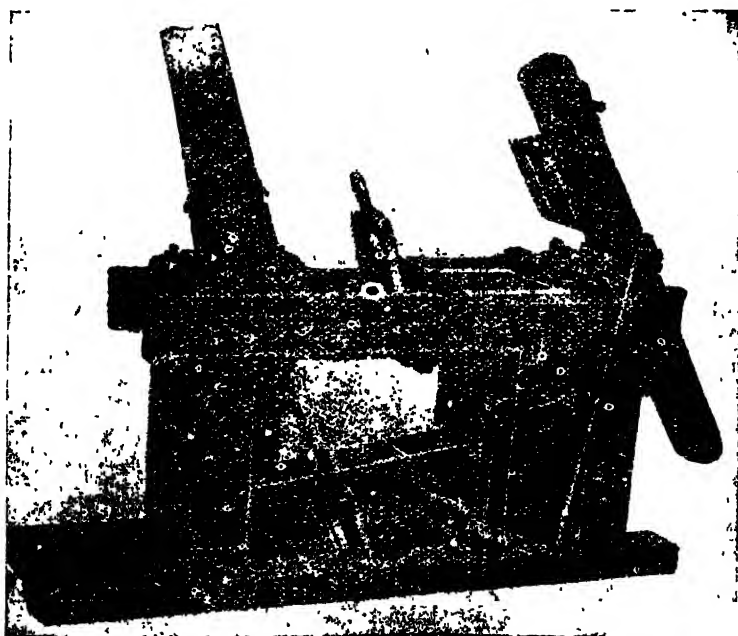
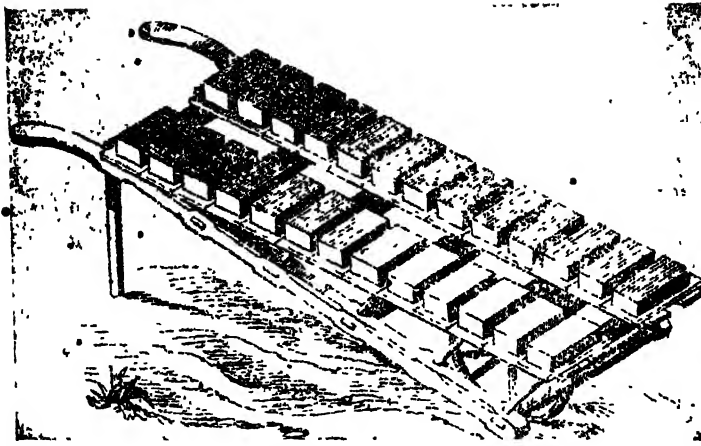


Fig. 4. Machine Press and Mould.



*Fig. 5. Wheel Barrow

ground, and the third being wheeled to and fro. The low walls of bricks in the drying ground are called hacks. These are built two bricks wide and eight bricks high, and the bricks are generally placed slanting, and not at right angles to the length of the wall. When the bottom row of one hack is formed, the workman begins a second hack leaving the first to get firm before it has to bear the weight of a second row. Plenty of straw or hay is at hand to cover up the bricks at night, or in bad weather. For the finer descriptions of bricks, drying under cover is adopted, and in some instances flues are carried under the floors of the drying sheds, and currents of air are carefully excluded.

The final process in brick-making is that of burning the bricks in a kiln or in clamps, the former being the best plan. The kiln may be a simple rectangular chamber, built of old bricks and rubble stone, with a narrow doorway at each end, and narrow fireholes lined with fire

bricks in the side walls exactly opposite each other. The workmen introduce through the doorway a quantity of bricks, and stack them loosely but with considerable art in cross courses, within the walls, leaving openings that shall act as flues throughout the whole mass and thus distribute the heat from top to bottom. When the kiln is filled, the top is covered in, and fires are lighted in the fire holes. The fire is at first got up gently, so that the moisture in the bricks may be gradually evaporated; but in two or three days, when the steam ceases to rise, the heat is raised, the doorways are bricked up, and the temperature continued till the fire begins to appear at the top. It is then slackened, and the kiln allowed to cool. An ordinary kiln will hold 20,000 bricks. The fuel consists in some places of fagots of wood and in other of pit coals.

When bricks are burnt in a clamp, they afford to a great extent their own fuel, for a clamp is an immense pile of

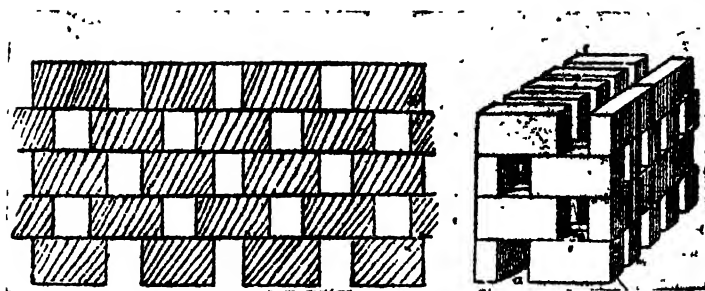


Fig. 6. Brick Drying.

carefully arranged bricks, in which breeze (the technical name for ashes) has been mixed with the clay in their manufacture. But layers of breeze are also added, and the whole is set fire to by means of fire places and flues filled with wood, coal and breeze. The burning of a clamp continues from two to six weeks. The art of clamping well exhibits no mean degree of skill in the workmen. They first build an upright or double battering wall along the centre, and then arrange a number of other walls in an inclined position on each side, corresponding in length and height with the central wall, and supported by it. The sides and top of the clamp are cased with

burnt brick and the lower courses of the central double wall are of the same material. There are numerous live-holes left in a large clamp, and these are fired in succession. The bricks near these live holes are burnt too much and generally spoiled by running together in masses called burrs, and the bricks at the outside of the clamp are not burnt enough and are laid aside for returning in the next clamp. Much judgment is required in apportioning the fuel to the size of the clamp, for the whole may be easily underburned or overburned, and so deteriorated or rendered comparatively useless.

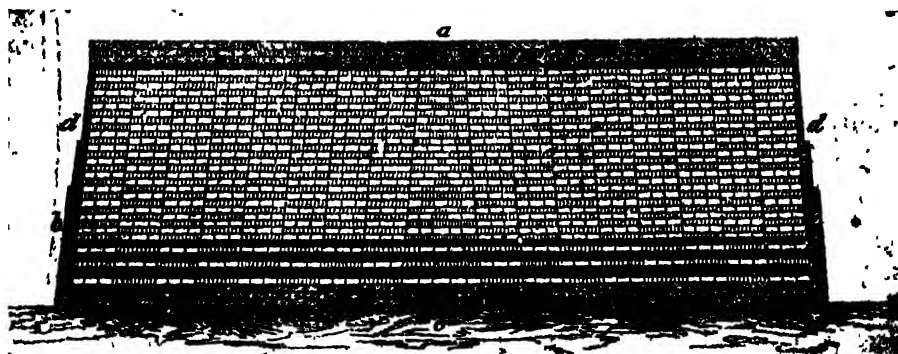


Fig. 7. Brick Kiln.

ARRAK AND SIRKA.

(By a Practical Expert.)

'ARRAK' may be defined as spirit extract of fruits and vegetables while 'sirka' is simply vinegar.

Arrak is an appetising preparation which makes the food not only palatable but also helps the digestion. It may be taken either plain or as a sauce.

Vinegar is largely employed for edible purposes and particularly in preserving fruits and vegetables, and in making pickles and chutnies.

• Recipes for Arrak. •

• BLACKBERRY. •

Take 5 srs. of good ripe blackberries. Wash them clean and allow to drip to free from water. Place them in a stone vessel, besmear with 1 ch. salt and set aside for 24 hours. Mash them well and strain through clean cloth. Put the pulp into a jar, close the mouth and place in the sun at day time and in the dew at night. Then strain again and finally bottle: cork airtight.

• ORANGE. •

Take 1 sr. juice of orange, mix into it 1 tola salt and put into a jar. Strain after 12 hours; mix into it 2 srs. of juice of ripe *gora* lime and put in a jar. Cover the mouth and place it in the sun and dew for two months. Then strain through clean cloth, bottle and close airtight.

• GRAPE. •

Take 1½ srs. juice of good ripe grapes, put in a jar and mix into it 1 tola salt. Cover the mouth and place in the sun and dew for a fortnight. Then, strain through clean cloth; put it back

into the jar and place again in the sun and dew for a month. Lastly strain, bottle and close the mouth airtight.

PINE-APPLE.

Peel the pine-apples, reject the eyes and cut into thin slices. Take 2 srs. of these slices in a stone vessel and besmear the same with 2 ch. salt. Cover up and let it stand for 12 days. Then grind them on a clean stone slab and strain the pulp through a clean cloth. Put the filtered juice into a jar and pour into it 1 poa juice of *pali* lime. Cover the mouth and place in the sun and dew for 2 months. Lastly strain, bottle and close airtight.

PEACH.

Take 2 srs. of good ripe peaches; put in a jar and strew over 1 ch. salt. Cover the mouth and let it stand for a week. Then mash thoroughly and pour on the pulp 1 sr. juice of *gora* lime. Cover the mouth and place in the sun and dew for 20 days. Afterwards strain through clean cloth, bottle and close the mouth. Put it again in the sun for one month. Lastly strain and bottle.

APPLE.

Select good ripe apples, peel and slice. Take 2½ srs. of these slices and pound them in a clean stone mortar. Put the pulp into a jar; mix into it 2½ ch. salt and cover up for 24 hours. Then pour into it 1½ srs. juice of *pali* lime and place in the sun and dew for 15 days. Next mash thoroughly and strain. Lastly put into a bottle and place the same for 1 month in the sun and dew with mouth closed.

CURRENTS.

Take $2\frac{1}{2}$ srs. of currants; $2\frac{1}{2}$ srs. of juice of *pati* lime and 2 ch. of salt. Put these three items together into a jar, cover the mouth well, and place in the sun and dew for one month. After that pour out the contents, mash thoroughly, strain and put again into the jar. Close the mouth and place in the sun for one month more. Then strain through clean cloth; bottle and close airtight.

APRICOT.

Take 4 srs. of apricot, wash them clean and soak in water for 48 hours in a vessel. Then drain out and mash into a pulp. Mix into it 2 ch. salt and 4 srs. juice of *gora* lime; put into a jar, cover the mouth and place the same in the sun and dew for two months. Lastly strain through clean cloth, bottle and close up airtight.

EMBLIC MYROBALAN.

Take 5 srs. of green emblic myrobalan of the *Kashi* variety; reject the stones and pound well. Express the juice and strain; put into a jar and stir in 3 tolas salt. Cover the mouth carefully and place in the sun and dew for a fortnight. Then strain through clean cloth, bottle, close the mouth airtight and again place in the sun and dew for one month. Finally strain and bottle.

KARAMCHA.

Take 2 srs. good ripe red *Karamchas* in a jar and smear over with 1 poa salt. Let it stand for 3 days and then squeeze out the juice. Mix into it 1 sr. lime juice (of the *pati* variety), put into the jar, cover the mouth and place in the sun and dew for 20 days. Finally strain

through clean cloth, bottle and close airtight.

FALSA.

Take 1 sr. ripe *falsa*, wash them clean, allow to drip and split them one by one. Then mix 1 ch. salt and $2\frac{1}{2}$ srs. of juice of *gora* lime; put into a jar, cover up the mouth and let it stand for 7 days. Then mash and strain the pulp. Put into a jar, close the mouth and put in the sun and dew for a month. Finally strain and bottle.

ALUBUKHARA.

1 sr. *alubukhara* 1 ch. salt 2 srs *pati* lime juice—put these three ingredients together in a jar. Close its mouth and leave aside for 21 days. After that squeeze out the juice, strain, bottle and close airtight.

Recipes for Sirka.**DATE.**

Take a quantity of date-juice in an earthenware vessel and heat the same on fire. Remove when it bubbles up and when cool strain through clean cloth. Put the juice in an earthenware (or porcelain) jar, cover the mouth and place the same in an open space so that it might receive sun and dew. After 10 or 15 days a thin film will appear on the surface. Skim it off and cover again. After 10 or 12 days another film will appear; skim it off. Repeat the operation in this way, removing the filmy layers so long as they form. Lastly when it ceases, strain, bottle and close the mouth. Vinegar is employed for many purposes particularly in connection with foodstuff.

PALMYRA.

Take a quantity of palmyra juice in an earthenware vessel and heat on fire. When it boils vigorously for some time remove and allow to cool. Strain through clean cloth, put into an earthenware vessel and place it in direct sun and dew. After some days a film will appear; skim it off and cover again. Repeat in this way as many times as the films appear removing them every time, and covering the vessel. Lastly when the film ceases to form, strain, bottle and close up.

SUGARCANE.

Take 10 srs. of sugarcane juice in an earthenware vessel and bring to boil. Remove when it bubbles up and strain when cool. Put it into an earthenware vessel. Cover the mouth and bury the same in the ground. The hole should be dug big enough to hide the vessel up to the neck. After some days a film will appear, remove it and cover again. Repeat in this way so long as films are formed. Lastly when this ceases, strain and bottle.

BLACKBERRY.

Take 15 srs. of the expressed juice of blackberry and strain. Put it into an earthen vessel and bring to boil. When it bubbles up pour it into a wide-mouthed jar, cover the mouth well and place in an open space in the sun and dew. Then a film will appear which should be collected and thrown away. Strain and leave it as before. The operation should be repeated as many times as the layer forms and the liquid strained every time. Finally strain and bottle.

PINE-APPLE.

Pare the pine-apple and cut into slices. Pound the slices on a clean stone slab and express the juice. Strain and take 19 srs. Put into an earthen vessel, and apply heat. Remove when it bubbles up and strain when cool. Fill a wide-mouthed jar with it, close the mouth well and place in the sun and dew. After 10 or 12 days a film will form, then strain and put back again in the jar. Finally when the film ceases to appear, strain and bottle.

GRAPES.

Take 5 srs. grape juice in an earthen vessel and apply heat. Remove when it bubbles up and strain when cool, through a clean cloth. Fill up an earthen vessel with it, cover its mouth and place in the sun and dew. When a film appears, skim it off, strain and let stand. Repeat the process so long as any such layer forms. Lastly when no further film appears, strain, bottle and close the mouth.

ORANGE.

Take 5 srs. orange juice in an earthen vessel and apply heat. Remove when it boils vigorously and strain. Fill a jar with it, cover the mouth and place the same in the sun and dew. When a film appears collect and remove it. Strain and put back the liquid in the jar. Lastly when the film no longer forms, strain and bottle.

RAISIN.

Take 10 srs. raisins and wash them clean. Put in an earthen vessel and boil with 10 srs. water. Remove when the raisins are cooked soft and let stand for

12 hours. Then mash thoroughly and strain the pulp through clean napkin. Put into a wide-mouthed jar, cover the mouth and place in the sun and dew. When a film forms, collect and reject it and strain it. Go on in this way until the layer ceases to appear and the fluid becomes clear. Finally strain and bottle.

FALSA.

Take 8 srs. good ripe *falsa* and mash them all. Pour on the pulp 12 srs. water and bring to boil. When only 2 srs. of decoction is left, strain and put into a wide-mouthed bottle. Cover the mouth and place in the sun and dew. Collect and remove as soon as any film forms. Bottle when no further layer appears.

GLOSSARY.

Alubukhara—Plum, alucha.

Apple—Apel, seb.

Apricot—Khobani, chuari.

Blackberry—Kala jamun.

Currants—Manacca.

Date—Khejur.

Emblie Myrobalan—Amlaki.

Falsa—Shukri, todachi.

Grape—Angur.

Karamcha—Karanja.

Lime—Jambira, gora lebu.

Orange—Kamla lebu.

Palmyra—Tal.

Peach—Aru, takpo, rek.

Pine-apple—Anaras.

Raisin—Kismis.

Sugarcane—Ak.

1sr.=4 poa=16 ch.=2 lbs.=32 oz.

5 tola=1 ch.

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FILE, ITS VARIETIES AND MAKING.

FILE, as is well known, is a steel tool having its surface covered with teeth, and used for smoothing and shaping metals, etc. Files are classified and named according to their shape, size, and fineness of cut, and the purpose for which they are made. Thus, in shape they may be flat, square, round or rat-tail, triangular, half-round, feather-edged, etc., besides being variously bent, in order to get at intricate work. Most files are made thicker in the middle, or bellied, a form which best suits the hands in the act of filing. Files generally are made of the best crucible steel, the forged and shaped blanks when ready for cutting being held upon an anvil by means of a long loop of leather-strap, into which the cutter places his foot. The face of the anvil is covered with a flat piece of pewter, the softness of which preserves the teeth on one side of the file when struck. The cutter forms the teeth by striking with a hammer a short, stout chisel held obliquely at an angle of about 12 degrees or 14 degrees from the perpendicular. If the chisel were perpendicular, a furrow like the letter V would be indented, and an equal burr struck upon each side, but as a cutting tooth somewhat like that of a saw is required, this is effected by the oblique stroke of the chisel, by which a burr is thrown up on one side only viz., towards the tang. The cutting is commenced at the point of the file; the chisel is then drawn backwards, laid upon the blank and slid forwards till it reaches the burr raised by the last cut; the blow is now struck, and another tooth and burr produced, which serves as a

guide for the next cut; and so on. The distance between the teeth thus depends on the force of the blow and the obliquity of the cut; for the ridge or burr, and the obliquity determines the distance of the cut from the burr. The skill of the workman consists therefore in the precise regulation of the blows.

Files are either single cut, i. e., made with a single series of parallel cuts or, more commonly, double cut, i. e., they have two series or courses of chisel-cuts, which are oppositely inclined at an angle of about 55 degrees to the central line of the file. The second course is made in the same manner as the first, but with lighter blows, and is usually somewhat finer than the first. This angular crossing converts the ridges into pointed teeth. Files used for soft metals which are liable to clog the teeth are single cut, i. e., they have but one course of cuts. Taper files have the teeth finer towards the point. Rasps for wood or horn, etc. are cut with triangular punches, each tooth being an angular pit with a strong burr, instead of a long furrow. The rapidity with which the blows are struck varies with the fineness of the file: sixty or eighty cuts are commonly made per minute. Classified according to fineness of cut, files are known as rough, bastard, smooth, and superfine. A superfine file of small size may have as many as 216 cuts per inch, while a large rough file may have not more than twenty-one cuts to the inch. The sharpness and abrading effect of files are greatly improved by subjecting them after cutting to a sandblast, whereby a slight recurvature of the burr, which is always present as the file leaves the cutter, is corrected, and the edge is rendered very keen.

Files have to be very carefully hardened and tempered. If heated too

strongly, or made too hard, the steel is so brittle that the teeth tear off; if too soft; they wear down rapidly, and the file soon becomes useless. Great care is also required in keeping them straight, as the sudden cooling necessary for hardening is very apt to warp the steel.

Many attempts have been made to cut files by machinery, but with only partial success; the chief difficulty arises from the necessity of modifying the force of the blow to suit the hardness of the steel. It is practically impossible to supply a large number of blanks all of exactly the same hardness; and if the machine be adjusted to suit the hardness of one blank, it may strike too heavy or too light a blow for the next; whereas the workman feels at once the hardness of the steel he is working upon, and adjusts his blows accordingly.

Never wet your fingers to turn a new leaf.

Never turn down the corner of a page to hold your place.

Never allow your books to damp, as they mildew.

Never allow them to get hot, as the board may warp, and the leather may crack.

Dust all books in your library occasionally.

To remove ink stains from a book apply oxalic acid on the tip of a camel hair brush and then soak it up with blotting paper.

Never put books with metal clasps or with decorative nails on the shelves by the side of other books, for the delicate bindings of the other books will suffer. Put all such things in a place by themselves.

Books kept on ordinary book shelves, and thus exposed to the air, will keep much better than those with closed doors.

IDEAS FOR SMALL CAPITALISTS.

SUGGESTIONS FOR VILLAGERS.

Mr. Javli Vittal Shen, Tirthahalli P.O., sends us the following:—

The suggestions given below are practically tested and the *Ryots* of my own land are deriving an additional income by adopting them. Such being the case any villager can try any of the suggestions and judge the truth of my opinion. The suggestions should not be blamed by the operator, if he is unsuccessful or dissatisfied for he can very well become a raw material supplier to the more able manufacturer, thereby receiving a proportionate profit. Now as most of the villagers are agriculturists I make suggestions in the agricultural line

Plantain Tree.

The plantain tree is a very valuable plant because there is no part of it to be thrown away as useless.

(a) **THE FRUIT:**—The plantain fruit is a wellknown nutritious food. But when this fruit is dried it becomes a readily digestible dietary for invalids and babies.

The drying process:—Get some best ripe fruits, those that have turned yellow. Remove the skins. Spread a clean cloth upon the floor and let the skinned fruits be scattered on it for 6 to 8 hours. Then remove them and dry in the sun till the watery part of the fruits is dried. For this purpose the small plantains (*Vatabale* in Kanarese) are best.

(b) **PLANTAIN CURRY.**—Choose the best green unripe plantains (*Karibale* in Kanarese). Remove the green rinds. Cut the skinned plantains into thin round slices. Apply to these some common salt to taste and fry in ghee till they turn yellow. Remove them from the kettle and spray some curry powder and fragrant spices. This will make a very tasteful substance.

(c) **PLANTAIN FLOUR.**—Pound the skinned raw plantains such as are used in making plantain curry, adding water little by little till it turns to a pulpy condition. Tie up the mouth of a large vessel by a strong piece of cloth. Place a quantity of the pulp upon the cloth and gently rub adding water little by little. When all the watery portion goes down into the vessel through the cloth, pound the remaining pulp again and repeat the process till the pulp contains no milky substance. Now let the filtrate stand undisturbed for 6 hours. Then decant the water off and collect sediment and dry in the sun. This forms a baby food and invalid food. If manufactured in large quantity it would be bought even by biscuit manufacturers.

All the above preparations should be marketed with a good name and neat packing. Each preparation may be packed in ground tins with attractive labels.

Small Trades & Recipes.

Deodorising Kerosine Oil.

Kerosine oil may be made odourless by shaking it first with 200 grains of chlorinated lime for over 9 litres, adding a little hydrochloric acid, then transferring the liquid to a vessel containing lime, and again shaking until the chlorine is removed. After allowing the materials to subside the clear kerosine oil is decanted and stored away.

Fly Paper.

Melt resin in any vessel over the fire, and while soft add to it enough sweet oil, lard or lamp oil, to make it when cold of the consistency of molasses. This spread upon writing paper with a brush will not dry in a long time and is so sticky as to hold fast the legs of any insect attracted to it.

Curing Skins.

Stretch the skin and tack it lightly on a board; scrape off all the fat with a blunt knife, and also remove as much of the congealed blood as possible. Now soak a rag with strong acetic acid (33 per cent.) and rub it well into the skin going into every nook and corner. Set aside to dry for one or two days, then repeat the acid dressing. When this second dressing is thoroughly dry, apply a 10 per cent. solution of ammonium sulphate with a good-sized paint-brush, and apply similarly a 10 per cent. solution of washing soda. The ammonia thus liberated slowly neutralises the acetic acid in the skin. This process is repeated the next day, and, then, after two days, the skin is rinsed under the tap, while still tacked on the board, using the hand

to cause the water to penetrate. Set aside to drain and then dry slowly in a warm room, but not against the fire. Finally, when dry, rub well with either benzoated lard or linseed oil.

Snow Cream.

Spermaceti	100 grains
Pure wax	100 "
Oil of sweet almonds	500 "
Rose water	50 "

Dissolve the fatty matters in a water-bath, pour the liquid into a marble vessel, and when the contents solidify stir with a pestle till uniformly white. During stirring add 5 or 6 drops of otto of roses.

Tobacco Flavour.

(a) FOR CUT TOBACCO.

Valerian	$\frac{1}{2}$ oz.
Cascarilla	1 oz.
Tonka bean	1 oz.
Orris root	$\frac{1}{2}$ oz.
Proof spirit	1 Pint.
Macerate for a week and filter.	

(b) FOR CIGARETTES.

Calamus	2 oz.
Orris root	6 oz.
Essence of white rose	6 dr.
Mitcham oil of lavender	20 m. m.
Oil of rose geranium	40 m. m.
Alcohol (70 per cent.)	2 Pints.

Exhaust the powdered solids by percolation with the alcohol to 2 pints, and add the other ingredients.

INDIA'S INDUSTRIAL PROGRESS.

Sandalwood Oil Industry of India.

The sandalwood oil industry in India has been of very recent growth, and is principally confined to the state of Mysore, which has extensive sandalwood forests within its boundaries. While the neighbouring districts of Coimbatore and Coorg are also noted for a fair share of sandalwood production, Mysore has all the advantages incidental to the manufacture of the oil, being supplied with cheap electrical power. Up to 1916 the State of Mysore in common with the Madras Government, has been exporting all its sandalwood cut in the area without refining it in the country. The output of sandalwood from these three districts then amounted to 3,000 tons per annum, of which 750 were consumed locally and 250 by the other parts of India. The principal consumer during these years was Germany which purchased nearly three fourths of the exports from India, which amounted to about 2,000 tons. Mysore's share of the production amounted to nearly 2,500 tons, Coimbatore and Coorg between them supplying about 500 tons.

Demonstration Match Factory in B. & O.

The Government of Bihar and Orissa have just established a demonstration match factory in the old saw mill of the Opium Factory at Gulzarbagh, on the outskirts of the Patna City. The objects

of the factory are to see whether good matches can be made in India from Indian woods at a profit in a well-equipped factory; to enable persons to see the best match machinery in action; to enable Government to give advice with confidence to persons who require it; and, lastly to train any person who desires to learn how to make matches in an up-to-date manner.

Dyeing and Printing in U. P.

Dyeing and printing is an important industry in the United Provinces, yet so far as the methods of dyeing go, they are practically in a primitive condition. It is not possible for untrained persons to obtain the required effects with artificial dyes which have now largely taken the place of vegetable dyes. The cottage weaver, though interested in the new methods cannot leave his room to get training in the art of dyeing. There is no difficulty now in obtaining synthetic dyes in large packings, but an organisation is needed for the supply of dyes in small packings. The chief need now is men trained in the use of artificial dyes who would go back to districts. Dyeing factories, or at least dyeing demonstrations, at important weaving centres are urgently needed. In fact, it is not possible for the weaving industry to progress without an extension of the dyeing industry on modern lines.

SCIENTIFIC AND TECHNICAL TOPICS.

Chemical Composition of Silk.

Under microscopic and chemical examination of the natural fibre of silk it is found to consist chiefly of fibroin and sericin. Both are composed of four elements; carbon, hydrogen, nitrogen and oxygen. There is rather a large proportion of hydrogen and oxygen in sericin than in fibroin. In addition to these a very trifling amount of waxy and more or less colouring matter are found. Sericin is always found on the surface of the fibre and commonly goes under the name of silk gum. After boiling, the fibre assumes the appearance of pure silk, freed from the gum, with its pearly lustre and soft brilliance. The wax and colouring matter disappear in the boiling together with silk gum.

Cows and Vitamin.

It is definitely known that man requires a certain amount of a substance known as vitamin C or the antiscorbutic vitamin; and unless the required amount is supplied by food the disease known as scurvy develops. This same fact is known to apply to certain animals also, among which are the guinea pig and the monkey.

But, according to American Dairy Scientists, dairy cows can live and thrive without vitamin C in their ration.

Electricity from Metal.

Based upon a principle which revolutionised scientific thought, a device which utilises the mechanical power of light rays and opens the way into an entirely new field of development has been made in U. S. A.

The device is very simple. It consists of a radio tube of a highly special character, and ordinary doorbell circuit, and an automobile headlight. The light from the headlight is concentrated upon the tube and, under these circumstances, an electric current flows through the plate (or telephone) circuit of the tube which holds open a switch in the bell circuit. With, however, the slightest interference in the intensity of the illumination of the tube, such as is caused by the shadow formed by a whiff of cigarette smoke, the current in the tube's plate circuit decreases, the switch closes, and the bell rings.

The discovery of the principle on which this device is based was one of the truly startling scientific events, since it altered prevailing ideas on the structure of matter, and upset the classic wave theory of light.

It was found that when a ray of light falls upon certain metals, especially those of the so-called alkali group, such as sodium and potassium, a stream of electrons is forced out. The electron stream, as everyone with a knowledge of

radio engineering known, constitutes an electric current. The current thus produced is very small, but by suitable amplifying apparatus its presence can be demonstrated through various laboratory experiments.

This "photo-electric" effect, because of the minuteness of the current, has heretofore remained a scientific curiosity, but it has now become possible to apply it practically. The invention consists in adding a photo-electric element to what is practically a standard radio tube. The tube is elongated, and the electron-emitting metal, such as potassium, is coated on the inside of the bulb. When light falls upon the sensitive coating, a flow of electrons is established, and this current is utilised to control the plate (or telephone) circuit of the tube.

The device is useful as a fire alarm in such places as the holds of ships, automatic unattended electrical stations, store-rooms of buildings and other places. At the least suggestion of smoke, due to overheating from any cause, an alarm can be sent out by both radio and wire to any desired number of stations.

In addition, this same device can be used in connection with variations of light for any purpose, such as the exact scientific matching of colours, the detection of flaws in tinplate and textiles, the turning on of street lights at twilight and extinguishing them at dawn, and for innumerable other applications.

Textiles From String Beans.

A process for making coarse cloth from the fibres of string beans was perfected recently for commercial use in Austria. The bean shells are treated like hemp, and the fibre that results can be spun, making a hard but strong yarn.

This new material is adaptable for making materials for which cotton has been used heretofore, and it can be used in making carpets, curtains, upholstery and saddlery after it has been bleached properly and printed.

Romance of Leather.

From time immemorial, leather has played an important part in the lives of the people of the World, hence, no doubt, the well known phrase: "There is nothing like leather."

The origin of tanning is prehistoric. Available information shows that the earliest inhabitants of the world sun-dried the skins of animals, afterwards softening them by rubbing them on stones. Later on they learned to cure skins by smoke, and with oils and fats.

"In China tanning dates back to the remotest era of its ancient history. The process of vegetable tanning is very ancient, and was known to the Egyptians, who were well acquainted with tanning, dyeing and embossing of leather. In the British Museum there is leather in a good state of preservation which was made 3,000 years before Christ. In the story of the Israelites, as told in the Book of Exodus, Moses mentions that rams' skins were tanned red, and also that the covering of the Tent of the Tabernacle was made of the same material.

The Romans were experts in vegetable tannage, using such materials as sumac, gall-nuts and bark, and from Rome the knowledge spread over Europe. The Moorish invasion of Europe in the Eighth Century introduced the manufacture of leather of a more elaborate type. From this leather the present Morocco leather was evolved.

FORMULAS, PROCESSES & ANSWERS.

Smoking Fish.

1217. T. J. Cochran.—Asks how to preserve fish?

This method of curing is almost as universal as that of salting in every country except India. Scientifically the preserving power of smoking is due partly to the desiccation by heat, partly to the antiseptic action of the small amount of creosote, together with traces of acetic acid and formaldehyde in the smoke.

The processes of smoking are of the simplest and require a minimum of capital, space, time or plant; anyone who can command a few fish and a small oven can readily smoke fish in the best way. An old packing case with a small opening at the bottom for the fire, open at the top, and with a removable cover and a few spits (rods) on which the fish hang, makes a very good hot-smoking kiln for small quantities, while the quality may be of the best, by placing the fire outside and passing in the smoke by a pipe, it will serve for cool smoking. Smoking is either hot or cold, light or heavy; in hot smoking the fish are placed quite near the fire and the smoke house kept at a considerable heat with sharper fires and slight ventilation; it is almost—in some cases quite—a cooking as well as smoking process. In cool smoking the nearest rows are several feet above the fire which is slow and smouldering; ven-

tilation is good, and the temperature ordinarily between 60° and 70°F. Cold smoking, in general produces smoked salt fish, while hot smoking gives an almost fresh and partly cooked fish. Light smoking is given with billets of wood and for only a few hours; the fish are but slightly coloured; heavy smoking is done with peas, saw dust, etc. and may last for six weeks in the case of high dried "reds" intended for long keeping. The wood used for smoking is usually hard wood such as oak, beech, birch, etc. Woods which contain resin are to be avoided since they give a bitterish, tarry flavour to the fish; it is used in billets, chips, shavings, and sawdust according to the nature of the smoke required. Peat is also very largely used; fir cones in places. Paddy husk which is almost everywhere obtainable at very cheap rates is found to give an excellent smoke in conjunction with various woods, chips and saw dust, from teak, while cedar, coir husk, etc., have proved very successful.

Depilatory.

1124. P. M. A., Lahore.—Wants a recipe of harmless depilatory.

A harmless depilatory is made as follows:—Lime is slaked with a solution of 5 to 25 per cent. of sugar, and the calcium saccharate thus obtained is ground into small lumps and saturated with

hydrogen sulphide. This product must be kept away from light and air.

For use this is mixed with talc, for example, and perfumed so that the final product contains 4 to 6 per cent. as a base. It is diluted with water until it forms a paste, which is applied to the spot from which it is required to remove the hairs. After five or ten minutes it is removed by scraping or by washing, and the hairs disappear at the same time without damaging the skin.

Preparation of Menthol.

1096. R. C. V., Bijapur—Wants a process for preparing menthol

Menthol is the principal constituent of all varieties of peppermint oil, in which it occurs both in the free state and combined as esters. It is most easily extracted from Japanese peppermint oil, as this variety contains more menthol than any other. The process is very simple. The oil is heated with alcoholic potash to saponify the esters if the maximum amount of menthol is desired, but in practice this saponification is rarely resorted to. The oil (or saponified oil) is exposed to a very low temperature, when a considerable proportion of the menthol is frozen out in the crystalline condition. It is then separated from the dementholised oil by a centrifugal apparatus. The liquid portion of the oil contains from 40 to 50 per cent. of menthol, and is sold as 'dementholised' peppermint oil. Menthol forms colourless, needle-shaped crystals melting at 43-44° and boiling at 215-216°. It has the odour and the taste of peppermint,

and is employed where a powerful peppermint odour or flavour is required.

Hints on Wall Painting.

99. R. K., Aijal.—Writes, "Can you give us some hints on wall painting"?

If a plastered wall be new, and has not been whitewashed, it will do to size it with glue water; but if it has been whitewashed, which is often the case, no glue sizing should ever touch it. Any preparation of that kind is liable, sooner or later, to peel off and spoil the surface for any future finish. A safer way is to take oil and coat the whole surface before painting, which makes a fast union of any wash to the wall. On such a base oil paints will adhere perfectly. But the principal trouble in painting walls is found in the defective character of the plastering. The surface layer of this painting ground can be prepared in various degrees of coarseness of grain to suit the artist's requirements. The more smooth and polished, however, the surface is made, the greater are the difficulties in the subsequent process of fixing owing to the absorbent qualities of such a ground being necessarily less perfect. The ground can also be prepared in any tint or colour that may be desired.

Certain pigments only are admissible, in order to ensure permanence, and regard must be had to the purity of these and to their absolute freedom from adulteration. These are, for the most part, composed of natural earths, or metallic oxides, since experience has proved that the most permanent colours are those derived from such sources.

Strike-Anywhere Matches.

903. K. V. A. Cochin.—Wants a recipe for strike-anywhere matches.

The tipping composition for "strike-anywhere" matches consists of red phosphorus with other ingredients as follow: (1) Phosphorus 1 part, chlorate of potash 8 parts, glue 4 parts, whiting 2 parts, powdered glass 8 parts, water 22 parts.

(2) Phosphorus 2 parts, chlorate of potash 5 parts, glue 3 parts, red lead $1\frac{1}{2}$ parts, water 12 parts. Safety matches have no phosphorus on the tip, but it is contained in the rubber. For tipping safety matches, use (1) chlorate of potash 1 part, glue 2 parts, sulphide of antimony 1 part, water 12 parts (2) Chlorate of potash 4 parts, bichromate of potash $1\frac{1}{2}$ parts, red lead 4 parts, sulphide of antimony 3 parts, with sufficient glue and water to form a paste. The rubber on the box is treated with phosphorus 2 parts, powdered glass 1 part, mixed with sufficient glue solution to form a thin fluid while warm. Red phosphorus varies in colour from red to brown; it is formed by heating the ordinary phosphorus to 240°C or 250°C . either in a closed space, or in an inert gas, such as nitrogen or carbonic acid. On heating the red modification to a temperature of 260°C . it changes back to the ordinary phosphorus. Red phosphorus does not take fire by simple friction like the yellow variety, but must be raised to a temperature of 240°C .

Curing Tobacco.

1138, H. H. P. Oudh.—Wants to learn the process of curing tobacco.

The easiest method of curing tobacco is to sprinkle the leaves with rum and make them into a cigar shaped bundle and bind the bundle tight with a cotton band. The package is hung up in a warm place, and is several times rebound, until finally the tobacco forms a solid mass, which is cut into slices as required. In tobacco-producing countries, the leaves are gathered and made into bunches, which are hung up in a shed to dry. When thoroughly dry, the leaves are very brittle; they are then exposed to the air on a damp day, and afterwards piled up in a pit, in which state they undergo a peculiar kind of fermentation that destroys the acrid constituents of the leaves. After fermenting for some time, the heap is opened and fermentation stopped, and when the leaves are sufficiently dry they are packed for export. On reaching the destination, the leaves are damped, the mid ribs removed, and the tobacco compressed into blocks and then cut into shred with revolving knives.

Desiccation for Coconut.

1120 G. S. F. Ratnagiri.—Writes "Please describe a suitable desiccator for coconut."

Desiccators are drying machines which carry the operation of drying to the degree of abstracting all the free or uncombined water, and frequently a goodly portion of the combined water when the water is combined with some volatile elements. Hence desiccators may be of any type of dryer which working by evaporation and working in

tensely, carry their usual operation to a more thorough degree. The dangers inherent to the various dry products are naturally increased as the desiccation proceeds and the machine needs designing in accordance, otherwise there is no essential difference from the usual types of kilns, stoves, cylinders, tunnels, rooms, and ovens. In fact, in many cases the difficulty is to prevent desiccation in portions of the product and in the direct-fired to avoid dehydration and calcination. There are many machines especially designed for desiccation, which are more or less similar to the drying machines available in the market.

Manufacture of Potassium Chlorate.

1017 K. N. Sind.—Wants to know how potassium chlorate is manufactured.

If chlorine acts upon milk of lime at a high temperature (60° to 70°C), the chlorine being in excess, hypochlorite is formed only as an intermediate product, which immediately is converted to chlorate. This is the reaction upon which the manufacture of chlorate is based. Chlorine is systematically passed over milk of lime in cast iron cylinders provided with stirrers, which are kept at the proper temperature mainly by the heat which the reaction itself involves if the combination is allowed to proceed at a sufficiently rapid rate. The chlorine is passed over the surface of the lime water till most of the lime has dissolved and been converted into chlorate. Any unabsorbed chlorine passes to another fresh cylinder in series where it is utilized. The solution is then boiled down to about 1.35 specific gravity with potassium

chloride which reacts, forming potassium chlorate. On cooling the bulk of the potassium chlorate crystallizes out. The mother liquors are boiled down a second and third time, and strongly cooled to recover the small amount of chlorate which remains in solution. The crude potassium chlorate is purified by recrystallisation, and is washed and dried in a centrifugal machine.

Otto Jasmine.

904. S. B. J. Pendra Road.—Wants a recipe for Otto Jasmine.

Linalol Oil	2 dr.
Bergamot Oil	3 dr.
Jasmine Oil	3 dr.
Jasmine	32 oz.
Alcohol	32 oz.

Bell Metal.

1520. (Illegible).—Requires instructions for working in bell metal and bronze.

Bell metal consists of the two metals copper and tin. Experience has shown that the best proportion of the two constituent metals is 20 to 23 parts tin to 80 to 77 parts copper. The melting and casting of bell metal is not so difficult as that of ordnance bronze. The copper is first melted down, and after heating the fused mass as much as possible the tin is introduced and an intimate mixture is promoted by vigorous stirring. Many bell founders do not add all the tin at one time, but about two thirds of it at first, and when this has formed a union with the copper the other third is added.

Casting Bronze.

The quantity of bronze to be prepared at one time, varies considerably, and may amount to a few ounces, or hundreds or thousands of pounds. Though the mode of preparing the bronze is the same in all cases, certain difficulties arise in casting small articles as well as large ones. For casting small pieces, a finished alloy of the desired proportion of metal is generally used, it being difficult to hit the exact composition required in preparing small quantities of bronze. The fusion, in this case, is always effected in crucibles, especial care being required to prevent oxidation of the tin as much as possible. The crucibles are placed in a wind furnace, and the surface of the bronze is kept carefully covered with pulverized coal, anthracite being best on account of its great density.

Making of Cheese.

1260 A. L. A. P. Coonoor.---Wants to know how cheese is manufactured.

The manufacture of cheese depends upon the property possessed by casein of being curdled by acids or ferments. In the case of sour milk the milk sugar has developed by the lactic fermentation some lactic acid, and this promptly throws out the casein in the insoluble form. In the case of sweet milk we usually accomplish the curdling of the casein not by the use of an acid, but with a ferment contained in the preparation called rennet. We would then have, according as one or the other method is followed, a sour milk cheese or a sweet milk cheese.

In cheese making from sweet milk, the milk, whether whole, mixed with cream, or skimmed, is heated to about 30°C and the rennet added. It curdles usually in from thirty to forty minutes. After the curd has formed and been cut, or "broken down" the heat is raised to 98°C. to insure the souring of the whey and its more complete separation from the curd. The curd is now cut up worked to free it from the whey, salted and pressed. After it has sufficient coherence it is taken from the press and placed in the curing room to "ripen."

Making Electro Blocks.

252. H. P. K. R. Bangalore City.---Wants to know the process of preparing electro blocks.

Electro-blocks are made by the application of electrotyping in the copying of wood engravings in electrolytic copper. The engraved wood block is first well brushed over with plumbago or simply moistened with water; it is then placed upon a level bench, and a metal frame somewhat higher than the block is fastened round it. A lump of softened guttapercha is then placed in the centre of the engraving and forcibly spread outward (towards the frame), by which air becomes excluded. A plate of cold iron is now placed over the guttapercha, with gentle pressure, which is afterwards gradually increased, by means of a press, as the guttapercha becomes harder. When the mould has cooled, it is carefully separated from the block, and well plumbagoed, after which the connecting wire and "guiding wires" are attached.

It is then ready for the depositing bath where it is allowed to remain until a shell of sufficient thickness is obtained, which will depend upon the size of the mould and the strength of the current employed. After removing the mould from the bath, it is rinsed in water, and the shell carefully detached, and the electrotype is next backed up with solder or a mixture of type metal and tin, the back of the electrotype being first brushed over with a solution of chloride of zinc. The edges of the electrotype are next trimmed and planed, the edges are bevelled. The plate is ready for mounting on a block of suitable wood which is effected by small iron pins driven into the level edges of the backing metal.

Depilatory Soap.

1278. R. L. S. Calcutta.—Wants a recipe for depilatory soap.

The following is a good recipe for a soap adopted to remove hair.

453 grms. glycerine, 907 grms. fat, (coconut oil) and 1844 grms. castor oil, are saponified with 1814 grms. 33 per cent. caustic potash lye; the soap is then filled with 113 grms. starch and 907 grms. sulfo-hydrate of sodium, and perfumed with 113 grms. citronella oil.

Glycerine Soap.

1361 R. R. D. Maibaong.—Wants a recipe for glycerine soap.

Nearly all soaps contain small quantity of this body which is not separated in the lyes. In some cases, however, a much larger quantity is desired, up to some 6 or 8 per cent. To melt this it requires great care, otherwise the soap tends to blister during

compression. The best ways to dry the soap somewhat further than usual till it contains say only 9 to 10 per cent moisture and then mill in the glycerine.

Removing Wrinkles.

1309 P. C. T. Travancore.—Wants a recipe for wrinkle remover.

The following preparation will remove wrinkles.

Alum	10 gr
Zinc Sulphate	5 ..
Glycerin	1 fl. dr.
Tincture of Benzoin	1 fl. dr.
Essence of Eau de Cologne	30 minims.
Distilled water	1 pint

Dissolve the salts in a little water. Mix the glycerine with the bulk of the water, and pour in the mixed essence and tincture. Mix the liquids. The results should be a non-separable milky lotion.

Leather Revival.

1400 P. K. R. Calcutta.—Wants a good recipe of leather reviver.

Fresh Eggs	5
Sperm Oil	6 fl. oz.
Glycerine	3 " "
Oil of Birch Tar	1 " "
Oil of Turpentine	5 " "
Methylated Spirit	5 " "
Water to produce	30 " "

Beat up the eggs thoroughly and emulsify the mixed oils. Lastly, add the glycerine, spirit, and acetic acid diluted with the bulk of the water.

Directions. Pour about a teaspoonful on the worn surface of the leather and rub in gently with a soft rag. After a few minutes' interval polish with a clean rag.

Fibre for Thread.

1459. M. S. Calcutta.—Kindly throw some hints on fibre for thread making

Threads, twines, cords, and ropes, in the true sense of the terms, are composed of two or more single yarns twisted together.

If threads, twines, cords, and strands thus formed are again twisted together, they are said to be "Cabled." The operation of cabling is resorted to when a specially hard surfaced thread, cord, or rope is required, as, for instance, some sorts of sewing thread, whip cord or driving ropes.

Flax for threads must be very strong, and is generally chosen with particular specifications. The coarser threads or yarns, such as shoe threads which require great strength, are usually spun on the dry, demi sec, or gill spinning principle. Fine yarns, for ordinary sewing threads, must be wet spun in the ordinary way.

Ordinary flax and hemp sewing threads may be divided into two classes. The one, known as cabled thread, is usually stronger and with a harder surface, which withstands friction better than the other. It consists of several yarns twisted together into a strand in the ordinary way. Cabled thread has same construction as a well-made rope that is to say, a number of yarns are twisted into strands, and several strands—usually three—again twisted together into the finished thread. For instance, a good 60's 3 cord flax thread may be composed of three yarns of No. 60's full warp twist, spun to the right and then twisted together to the left, forming a

thread about equal in weight to 20 leas per lb.

Preserving Dead Bodies.

1451. B. K. B. Chandrapura.—Wants to preserve dead bodies.

Dead bodies may be preserved by the application of embalming fluids. The following is an approved formula for preparing the same.

Solution of formaldehyde 11 lb., glycerine 4 lb.; sodium borate $2\frac{1}{2}$ lb.; boric acid 1 lb., potassium nitrate $2\frac{1}{2}$ lb., solution of eosin, (1 per cent.) 1 oz.; water enough to make 10 gal. The sodium borate, boric acid and potassium nitrate are dissolved in 6 gal. of water; the glycerine is added, then the solution of formaldehyde, and lastly the solution of eosin, and the necessary amount of water.

Preparation of Fuschine.

1371. R. B. S. Poona City.—Requests us to explain the preparation of fuschine.

Fuschine is prepared from aniline oil by the application of various reagents. In one process 1 cwt. of aniline oil and $\frac{1}{2}$ cwt. of hydrate of arsenic acid (sp-gr. 1.7) are heated together for 4 to 5 hours at a temperature which should not exceed 190° - 200° C. The red mass obtained is broken into small lumps, and boiled with water; the solution is then filtered and poured into tanks, where it is allowed to stand 2 or 3 days to crystallise, the mother-liquor is then run off into watertight tanks, and a mixture of chalk and lime is added in order to precipitate the arsenic and arsenious acids. The fuchsine

thus obtained always contains arsenic, and when it is desired to use a salt of rosaniline for colouring liquors and sweetmeats, it is necessary to employ chloride of carbon or mercuric chloride in its preparation.

Cement Tiles.

1314. S. S. Meerut City.—Asks how to make cement tiles.

Tiles made of cement are used for both roofing and flooring. They are made in metal moulds consisting of a lower box or container into which an upper plate or plunger fits closely. The plunger is lifted, its lower surface and the inside of the box are oiled or wetted, the box is filled with concrete paste, and the plunger is brought down so as to compress the mixture, the tile is turned out on to a bench and in a few hours is ready for use. About 500 tiles can be made in a day by one man.

Seasoning of Timber.

1481 P. F. G., Alwaye.—Asks how timber is seasoned.

Seasoning, literally, is the submitting of green timber to the action of the weather for several seasons, during which period the natural juices gradually harden, and the moisture evaporates without any detriment to the timber. The term has, however, been rather loosely applied to all processes, whether natural or artificial, whose object is to remove the moisture of green timber, the latter process being more accurately described as drying. In preparing for seasoning the trunks are lopped, barked and hewn square, as soon as possible after felling them, stacked in open formation under cover, so that air can circulate freely around and between them. Protection from the direct action of the sun

should be provided, and also from the rain. Timber requires from two to five years to season in this manner, according to its size.

In wet seasoning which considerably shortens the time necessary for seasoning the logs are submerged in a running stream, with their butts or root ends towards the flow of the tide, for from fourteen to twenty-one days, according to size of the timber.

Besides there are artificial means of seasoning timber, consisting chiefly in exposing it to the action of steam or boiling water.

Flavour of Beer.

1353. S. V. R. N., Persia.—Asks "How to make the flavour of beer agreeable?"

The flavour and aroma of a beer depend materially upon the employment of good sound materials, for it is obviously impossible to brew a good flavoured beer from fusty malt, and it is equally impossible to secure the proper malty flavour from raw and under-cured material. Manipulation has also much to do with flavour, so also has the quality of the water employed. The aroma will depend materially upon the quality of the hops used; it cannot be expected that an article with a fine aroma will be produced if only coarse flavoured hops are employed in its manufacture.

The species of yeast employed has also much influence on the flavour of beer, each different species, and indeed variety, possessing properties in this respect. Those who advocate the employment of yeast derived from one single cell, claim that inasmuch as one variety only is thereby made use of one uniform flavour is secured in the finished beer.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1173 M S Rangoon—We do not undertake any commission business nor we do any direct business. We only give information to our constituents. Can supply Burma cheroots and tobacco leaves on wholesale scale

1174 N V R Bezavada—The following are some of the commercial firms of Quetta—U Malhotra & Co; The Beluchistan Stationery Mart; Empire Trading Co, London Street; Universal Trading House, Mission Road Shahanshalal Trikhi Bros, London Street and Sovan Singh & Sons, Babu Mohalla

1175 M B K Mandalay—For a list of books on silk dyeing and cleaning write to Thacker Spink & Co, 3, Esplanade East and Chackraverty Chatterjee & Co, Ltd, 15, College Square; both of Calcutta

1176 K K R Combatore—Machines for small industries may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta

1177 B D. Mangalore.—Your enquiry appeared in the last June issue under Trade Enquiry columns

1178 A. A. Nowgong—Your enquiries are in the nature of an advertisement hence these should not be published in these columns. For speedy sales of articles manufactured by you advertise in the pages of newspapers and periodicals.

1179 J. S. A Bhandup—No easy process is known to us.

1180 A M. C Calcutta—As suggested, you may publish a book containing the formulas you have got For selling used postage stamps and other allied things advertise in the pages of newspapers and periodicals.

1181. M. D. Gujranwala.—You may prosecute your studies in mechanical and electrical engineering in Glasgow or Edinburgh Universities.

1182 H. M Shimoga—Thread ball making machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta

1184. T A S P Tanjore—Try to sell the fruits before they are over-ripe Wants to buy all kinds of fruits.

1185. D. S Simla—Macerate mercury and copper sulphate in equal proportion when the product will be a pasty stuff which can be moulded into fancy toys.

1186 R R P Tanjore—Your relative may prosecute his studies in the Benares Hindu University, Benares

1188 S B. C. Puriha—Your enquiries are in the nature of an advertisement hence these should not be published in these columns.

1190 B P. R Vclangi—Cigars are stocked by B K Banerjee & Bros, B-88, Municipal Market, Calcutta; Bombay & London Tobacco Co, 86-A, Clive Street, Calcutta; Roy & Paul Chawdhury, 6, Commercial Bldg, Calcutta; Brojomohan Nagendralal Sircar, Strand Road, Akyab, New Tobacco Stores, Merchant Street, Mandalay and Burma Tobacco Co., Ltd, 74, Merchant Street, Rangoon For starting prospective industries go through the September 1923 issue of **Industry**.

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Post Box No. 230.

Madras—Post Box No. 1260.

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices



1191 P. K. C. Bombay.—Ice making machines may be bought of Burn & Co., Hongkong House, Council House Street, Calcutta. Cinema machines may be supplied by J. F. Madan & Co., Ltd., 5, Dharamtola Street, Calcutta.

1193 N. L. Ludhiana.—You may go through Cape Times, Cape Town; South African Review, Cape Town; Catholic Magazine for South Africa, Cape Town and Educational News of South Africa, Cape Town; all of South Africa Woollen yarn may be bought of E. B. Bros. & Co., 82/8, Colootola Street, Calcutta. There is no such journal known to us. Wants to be put in touch with dealers of artificial silk thread.

1194. T. H. A. Mangalore.—For industrial books enquire of Chackraverty Chatterjee & Co., Ltd., 15, College Square, and Book Company, 44A, College Square; both of Calcutta.

1195 R. R. Ernakulam.—Candle making apparatus may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

1196 D. A. Palnela.—For books on drawing write to Thacker Spink & Co., 3, Esplanade East, Calcutta. Paper manufactured at home will not be suitable for writing.

1198. J. V. Bellary.—All-India Directory may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta and Standard Publicity Co., 3 Railway Road, Lahore.

1199 E. W. Balapitiya.—Your queries are in the nature of an advertisement hence these should not be published in these columns.

1200. B. S. G. S. Srinagar.—For the book required enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta. Teas may be bought of Mukherjee Bros., 17-19, Shambazar Bridge Road and Bhattacheryya & Co., Ltd., 1, Swallow Lane, both of Calcutta.

1202 B. M. C. Sukkur.—Process of preparing ink tablets appeared in July 1925 issue. Recipes of blue-black ink will be found in June 1923 issue.

1203 D. H. S. Karwi.—Biris are not made in machines. Yes, you may start cigarette factory. It has now ample scope for further improvement. There are not many cigarette factories in India. The following are some of the cigarette factories of India—Burma Tobacco Co., 74, Merchant Street, Rangoon, Burma, American Eastern Tobacco Corporation Ltd., Dum Dum Road, Dum Dum, Calcutta Cigarette Factory, Belur, Howrah, Naidu Cigarette Factory, No. 2 Howrah, Peninsular Tobacco Co. Ltd., Basleopore, Monghyr; and Indian Leaf Tobacco Development Co., Darbhanga.

1204 N. P. S. Allahabad.—For endi and muga silk enquire of Dass Talukdar Agency, Strand Road, and Sarma Agency, both of Gauhati, Assam.

1205 R. C. D. Sihor.—First of all analyse the mineral to ascertain what it really is. Then you should try to secure a partner, as well as foreign parties dealing in mineral by putting an advertisement in the pages of newspapers and periodicals.

1206 K. S. A. R. Salur.—Motors and accessories may be supplied by the following firms.—French Motor Car Co., Ltd., 234/3, Lower Circular Road; Stuart & Co., Ltd., 3, Mango Lane; G. McKenzie & Co., Ltd., 18, Park Street; M. T. Ltd., 59-60, Chowringhee Road; Great Indian Motor Works, 25-29, Park Street; Ford Motors Ltd., 110/1, Russa Road; A. Milton & Co., Ltd., 156, Dharamtola Street; Allenberry & Co., Ltd., 24, Park Street and



**Cheapest House For
SPORTING GOODS
Silver Medals, Cups &
Shields.**

**Fine Silver Medals... in
Velvet lined cases.**

Rs. 3/12/- each.

**Largest Stock & Variety
Illustrated Lists Free.**

**CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

Breakwell & Co, 44 Free School Street; all of Calcutta.

1207. S. L. D. Jalalabad.—The apparatus referred to by you will produce electric current no doubt but it will not be sufficient to light a lamp.

1208 •R. M. W. Alamarathupatti.—For melting iron engage an expert. Machine tools may be supplied by Alfred Herbert Ltd, 13, British Indian Street and Associated British Machine Tool Makers Ltd, Temple Chambers, 6, Old Post Office Street; both of Calcutta.

1209 K. M. K. Twante.—Answer to your previous letter appeared under No 588 in June issue.

1210. R. V. S. Jalarpet.—For starting prospective industries go through the September 1923 issue of **Industry** and select one which will suit you best. Then we shall be glad to discuss the merits and demerits of it. The following firms deal in bristles.—Bonner & Co, 209, Cornwallis Street, Calcutta; Volkart Bros, Armenian Street, Madras and K. L. Mehta & Co, Cawnpore.

1211. B. D. Tandoadam.—You may use caustic potash. Process of silvering glass appeared in December 1925 issue.

1212 S. R. W. Bhopal.—Process of softening rubber appeared in June 1923 issue.

• 1213. C. M. Aijal.—Following are the addresses required by you. Bowreah Cotton Mills Ltd., Mg Agt., Kettlewell Bullen & Co., 21, Strand Road, Calcutta, Mohini Cotton Mills Ltd., Mohini Babu's Road, Kushtia and Edward Sassoon Mill Ltd, Mg Agts, E. D. Sassoon & Co, Ltd, Ballard State, Bombay.

1214. P. N. Sullia.—Ivory goods may be supplied by Sheo Sahai, Kalyanji-Ka Rasta, Jaipur and Govindram & Udairam, Ajmer Gate Jaipur.

1215. S. M. R. M. Ellore.—For a buying agent for machine in Lincoln you are referred to Buyer's Bureau of Export Mail, 541A, Long Acre, London.

1216. A. K. A. K. Ernakulam.—Vide No. 963 in the last issue.

1217. T. J. Cochlin.—For the machine required enquire of T. E. Thomson & Co., 9, Esplanade East and Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street; both of Calcutta. Process of preserving fish prawns appears elsewhere in this issue.

1219 S. R. A. N. Jubbulpore.—For fans driven by clockwork process enquire of the Union Trading Co, 100, Harrison Road, Calcutta. Wants the address of Saturday Pictorial published in Bombay. Wants to buy Suvarnamaya Gulkand.

1220 K. C. N. Bannu.—Manufacture of capsules requires higher technical knowledge and special machineries. It has not yet been taken up by any engineering firms in India. Recipes of lime juice glycerine appeared in the last issue.

1222 P. C. T. C. Gujranwala.—Artificial silk yarn may be supplied by K. Nishida & Co., 1, Nichome, Yokohamacho, Nihonbashi-ku, Tokyo and the Shevjer & Co, Ltd, 41, Sanchoe, Honcho, Yokohama, both of Japan. For bottle brain wave enquire of Union Werke, A. G. Mannheim, Germany; The 20th Century Machinery Co., 396-98, Green Bush Street, Milwaukee, Wisconsin, U. S. A. and Farrow & Jackson Ltd, 16, Great Tower Street, London, E. C. 3. Methylated spirit may be supplied by Standard Distilling & Distributing Co., New York, United States Industrial Alcohol Co., New York and Voss Alcohol Export Corp., New York; all of U. S. A. Woollen yarn may be supplied by Wellweberer Spiegel & Co., G. m. b. H., Baden-Baden and Becker & Co., G. m. b. H., Reicheclarastrasse 2, Mainz; both of Germany.

SETT DEY & Co.

ORIGINAL HOMEOPHARMACISTS,
42 Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations
Catalogue Free On Application.

1223. M C Machlipatnam.—For brass tumblers of required description write to Jeewanlall & Co, 55, Canning Street, Calcutta.

1224. B. K Srinagar.—For thermometers enquire of Bengal Scientific Suppliers Ltd, 29-32, College Street Market, Calcutta and Scientific Instrument Co, Ltd; Johnstongan, Allahabad For tin plates enquire of Balmer Lawrie & Co, 103, Clive Street, Calcutta

1226 B S P S. Yen—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lal Bazar St., Calcutta. Knitting machines may be had of W H Brady & Co, 26, Strand Road, Calcutta For hire purchase system communicate direct with the firm This firm is the representative of Harrison's machine in Calcutta. For disposing of your goods manufactured advertise widely

1227. H. C C Raipur—Swedish matches may be bought of Lal Chand & Bros, 33-A, Central Avenue, Calcutta.

1228 M T. A Akyab—Packing papers of various kind may be supplied by Ghose Bros., 63-J, Radha Bazar Street, Calcutta

1229. T I B Akyab—Your enquiry being in the nature of an advertisement should not be published in these columns.

1232. K A S Badulla—For securing agency of motor cars you may correspond with the following firms quoting your references.—Allen Motor Co, Columbus, Ohio, Bailey

Motor Car Co., Kalamazoo, Michigan; Jordon Motor Car Co., Cleveland, Ohio; Liberty Motor Car Co, St. Louis, Mo and Paige Detroit Motor Car Co., Detroit, Michigan; all of U. S. A. You may correspond with the Manager, Uebersee Post, 10, Solomofstrasse, Leipzig, Germany for taking sole agency for Ceylon.

1233. T. C K. Sukkur.—Fire works are manufactured by Orient Fire Works Co., 85/1, Upper Circular Road, Calcutta. Chemicals may be bought of Champaklal Bros., 72, Canning Street, Calcutta

1235 M. N H. Sylhet—For a list of technical schools of India write to the Directors of Industries of various provinces

1236 C S No Address—Articles on commercial subjects such as how to do business; how to open an agency business; how to transport goods, etc, appear regularly in the columns of **Commercial India** the sister journal to **Industry**.

1237. B P W Lahore.—You may go through the following journals dealing with printing trade and industry. The Printer & Publisher published by The McLeon Publishing Co Ltd, Montreal, Canada; Printer's Engineer published by Walker Bros, Bonverie Street, London, E. C. 4; Printer's Register, 13, Johnson's Court, Fleet Street, London E. C. 4 and Printing and Allied Trades published by S C Phillips & Co, 47, Cannon Street, London, E. C. 4.

1238 S. S. T Fatehgarh—**Chua** is a dark viscous liquid derived from vegetable sources. Its Hindi equivalent is not known. Process of preparing peppermint appears elsewhere in this issue.

1239. P. C Jhang—The directory referred to by you is not available in India If you go through these columns and the advertising pages of **Industry** you will find the addresses required.

1240. G. R. G. Ahmedabad.—For enquiry regarding motor repairing and motor driving refer to 1206 above Watches are repaired by West End Watch Co., Dalhousie Square, Calcutta. Try to be an apprentice. Papers are

Kaminia Oil

(Regd.)

Finest dressing for the Hair Delicately perfumed. Re. 1/- per bot. charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot. of $\frac{1}{2}$ ounce Rs 2/-, $\frac{1}{4}$ ounce Re. 1/4/-, V. P. & Packing extra.

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,

P.O. Box 2062, Juma Masjid, Bombay.

manufactured by Titagarh Paper Mills Ltd, Chartered Bank Bldg, Clive Street and Bengal Paper Mill Ltd, 103, Clive Street; both of Calcutta.

1241. B. G. D. Dacca.—For learning business by post you are referred to The Bennet College, Sheffield, England.

1242. P. D. G. Bankura.—For ottos enquire of Paradise Perfumery House, 29, Colootola Street, Calcutta. Saffron may be supplied by Madhab Chandra Daw, 4, Armenian Street, Calcutta.

1243. N. K. V. Simla.—No other man who cures stammering is known to us.

1244. P. G. I. Tanjore.—Process of preparing furniture varnish appeared in November 1923 issue. Composition of strike-any-where matches appears elsewhere in this issue. Any soft wood of straight fibre will be suitable for match splints and veneers. Gunny bags may be supplied by Bird & Co., Chartered Bank Bldg, Clive Street, Calcutta and Begg Dunlop & Co., 2, Hare Street, Calcutta.

1245. S. S. Maymyo.—Wants services of a scientific and industrial formula expert.

1246. H. C. C. Narainganji.—Arrangements have been made for teaching the art of block making in the Government Art School, Chowringhee, Calcutta. For further particulars enquire of the Principal.

1248. G. P. P. Jharsuguda.—Peppermint crystal cannot be made artificially. Artificial gold may be made by melting together 96 per cent. copper and 4 per cent of antimony. For atta grinding machines enquire of T. E. Thomson & Co., 9, Esplanade East, Calcutta.

1249. V. S. R., Secunderabad.—For securing medical degrees by correspondence you may communicate with the heads of the following institutions: The Hahnemann Medical College of Chicago, 1811-1817, Cottage Grove Avenue, Chicago, Illinois; Homeopathic Medical Association, 4041, N. Keeler Avenue, Chicago, Illinois and The Homeopathic Medical Society of the State of Pennsylvania, 1433, Spruce Street, Philadelphia, Pennsylvania; all of U. S. A.

1250. S. K. J. Co., Madras.—Electric batteries may be supplied by Bright Star

Battery Co., New York; Philadelphia Storage Battery Co., Philadelphia, Pennsylvania and Willard Storage Battery Co., Cleveland, Ohio; all of U. S. A. Electrical bulbs may be had of Corning Glass Works, Corning, New York; Libby Glass Co., Toledo, Ohio and Lippincott Glass Co., Cincinnati, Ohio; all of U. S. A. Lanterns may be supplied by Bese Light Co., Canton, Ohio; Wolf Safety Lamp Co., of America, Inc., Brooklyn, New York and R. E. Dietz & Co., New York; all of U. S. A. Toilet requisites may be supplied by Overland Manufacturing Co., New York; Andrew Jergens Co., Cincinnati, Ohio and Talcum Puff Co., Brooklyn, New York, all of U. S. A. Other addresses you require will be found in back issues under these columns.

1251. S. A. R. C. Hyderabad.—For the books mentioned by you please try Thacker Spink & Co., 3, Esplanade East and Butterworth & Co., 8, Hastings Street; both of Calcutta.

1252. C. Bios.—For chicory try S. N. De, P. B. 7851, Calcutta. For adulteration with coffee the fresh roasted root is ground to powder in a mill.

1253. A. R., Kyaukse.—The following is a list of glass factories in India: Calcutta Glass & Silicate Works, Belgachia, Calcutta; Bengal Glass Works, 39/1, Canning Street, Calcutta; Paia Fund Glass Works, Talegaon, Dabhade, G. I. P. Ry; Allahabad & Jubbulpore Glass Factory, Ghamapur, Jubbulpore.

1254. H. S. Sargodha.—Wants to be introduced to a hair specialist.

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College

USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers

Factory—Baranagar and Barisal,

Office—113, 114, Khargapotty St., Calcutta.

1255. G. K. Anantapuram.—If you go through Thacker's Indian Directory, you will get a list of newspapers and periodicals. For the present the following will perhaps serve your purpose: Leader, 14-A, South Road, Allahabad, Pioneer, 17, Church Road, Allahabad; Bihar Herald, Moradpur, Patna; Bombay Chronicle, 3, Meadows Street, Fort, Bombay, Praja Mitra and The Parsi, The Times Bldgs, Fort, Bombay, Young India, 36-A, Chowpatty Road, Bombay, Amrita Bazar Patrika, 2, Ananda Chatterji Lane, Calcutta; Statesman, 6, Chowringhee Road, Calcutta, Forward, 19, British Indian Street, Calcutta and Englishman, 9, Hare Street, Calcutta.
- 1256 K K Maiwar—Refer your query to the S R Batohli, 9, Grants Lane, Bow Bazar, Calcutta.
- 1257 N E M, Ahmedabad.—For soap making apparatus write to Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta who will supply you with estimates and other allied information.
- 1258 M D S, Lahore—Aerated water making machines may be supplied by Little & Co, 3, Grants Lane Aminchad Mehra & Sons, 34, Armenian Street and Biswakarma Agency, 84/A, Clive Street, all of Calcutta. Chemicals may be bought of C Biswas & Co, 125, Bow bazar Street and B K. Paul & Co, 113 Bonfields Lane, both of Calcutta. For industrial books enquire of Chakraverty Chatterjee & Co 15, College Square, Calcutta. For commercial books try Kamala Book Depot Ltd, 15, College Square, Calcutta.
1260. J. A. D. & Sons, Bastora.—Process of preparing soap powder appeared in August 1925 issue of *Industry* which you may consult.
1261. R. R. S., Moodbidri.—Cinema films are manufactured by J. F. Madan & Co., 5, Dharmatola Street, Calcutta and Pathe Cinema Ltd, Pathe Bldg, Ballard Estate, Bombay.
- 1262 M G. S., Poona City—Wants to be put in touch with biri dealers of Calcutta.
- 1263 S S H, Brahmanbaria.—Printing machines may be bought of K Banerjee, 8, Canning Street; Ashutosh Addy & Co, 15, Lower Chitpore Road and John Dickinson & Co., Commercial Bldgs, all of Calcutta. Printing types of good quality are also stocked by the above firms.
- 1264 S M S. Cuttack—Bone dusts are used as fertilisers. On the 4th August bone meal was quoted at Rs. 108 per ton at Calcutta. Of the local consumers tea planters take the bulk.
- 1265 L. A. Irinjalakuda—Cameras may be supplied by Photohaus Leisegang, Potsdamerstrasse 138, Berlin, Germany; Mono Werk Rudolf Chaste, Magdeburg 15, Germany; Eastman Kodak Co, Rochester, New York, U S A and Ansco Co, Binghamton, New York, U S A. You may write to the Editor, *Übersee Post*, 10 Solomonstrasse, Leipzig, Germany for sample copy. For analysis you may try The British Drug Houses Ltd, Graham Street, London, N 1 England and Dr. Ghose's Laboratory, 5, Cooper's Lane, Calcutta. An article on photography will appear in an early issue. Can supply civet, beeswax, canes, gummiresin, oilbanum, coconut oil, mats and other Malabar produce.
- 1266 B C Kewari—Further particulars of chopping tools referred to by you is not available.
- 1268 A M A I Dolosbage—Silk goods may be supplied by Barlet Jos rue Reaumur 110, Paris, France, Soil Artificielle, r du Louvre 16, Paris, France; Balas Dubouchet, rue des Capucins 22, Lyons, France; Herzog & Co. Ltd, 28, Gresham Street, London E. C 2; Dunkley Joseph & Son Ltd., John Jay, 53, Aldermanbury, London, E. C. 2; China Silk Agency Co., Ltd., Sanghai, China; Transmarina Trading Co., 12, Nanking Road, Shanghai, China; Amano & Co., 3113, Nichome, Sannomiya-cho, Kobe; Seitaro

LIMITATION OF FAMILY

Third Ed. 5 Portraits, 55. Engravings.

357 Pages, Price Rs. 3. Postage Extra.

A comprehensive and Confidential Treatise. Every parent desiring to regulate the number of children according to his health and means will find it a God-send. Ask for table of detailed contents which will be sent free.

K. M. DAS & CO.,

291/1, Telepara, Samseoker St., Calcutta

Aria, 11 Itchome, Onoecho, Yokohama and Arumi & Co Ltd., 13 Itchome Sunfiyoshi-cho, Yokohama; last three of Japan

1270 M K R. Cuttack—The following are vernacular equivalents of *Cocculus Indicus* Hind "Kakimari," Bomb—"Kakaphel," Tam—"Kakkay," "Kollivirai" Vernacular equivalents of lovage are "Ajawan," "ajwain," "ajwan," "juvani," "ajano," "chuchara," "ajano," "owa," "amam," "omamji," "omu," etc Vernacular equivalent of smallage is not known

1271 U M F Khurda—For pale gelatin enquire of Madhab Chandra Daw, 4, Atmenan Street, Calcutta Chemicals may be bought of B. K Paul & Co, 113, Bonfields Lane, and C Biswas & Co, 125, Bow Bazar Street, both of Calcutta Indigenous product may be had of Banshidhar Dutt & Co, 126, Khengraputty, Barabazar, Calcutta

1274 G P K Sholapur—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bahazar Street, Calcutta

1276 M V R Bezwada—Animal charcoal may be bought of R C Gupta & Co, 84, Chive Street, Calcutta

1277 D R Vizianagram—Rolled gold chains may be supplied by K G Maniar, 55/1, Canning Street and Union Trading Co, 166, Harrison Road, both of Calcutta C I F quotation includes cost, insurance and freight Tariff duties on toilet articles are charged at 30 per cent *ad valorem*. Your other queries are not in our line

1279. M B Aligarh—Recipes of depilatory will be found in this issue of **Industry**. It is not possible to suppress the bad smell of barium sulphide

1281. K. W, Bombay—Formulas of Kesharjan and Viswanath oils are not known But formulas of hair oils similar to those oils will be found in the booklet *Hafr Oil Manufacture* published from this office

1282 M C. J Bombay.—For enlarging photos write to Campbell Studio, New York; Hall's Studio, New York and American Frame & Picture Co, 114, Tulton Street, New York; all of U. S. A.

1283. M. K D. Rajkot.—Can supply waste cloth found in tailor's shop.

1284 C. M Aijal—Wants the address of F F Zephir yarn made in Germany

1285 M R S Madras.—Vernacular equivalents of the articles mentioned by you are not known We cannot give our opinion on the efficacy or otherwise of the depilatory soap

1286 K R N Tirumangalam.—Wants to buy fighting cocks and hens.

1287 N K Rajahmundry.—A formula of preparing peppermint lozenges will appear in an early issue.

1288 S C D Iheria—A recipe of silvering mirror will be found in December 1925 issue

1289 P B B Dacca —For books on trade, business and banking enquire of Kamala Book Depot Ltd, 15, College Square, and Thacker Spink & Co 3, Esplanade East; both of Calcutta Telegraphy is taught at City Commercial College, 95, Upper Circular Road, Calcutta. No such journal is known to us

1290 E B R M Dacca—For drying machines required for a rice mill write to Marshall Sons & Co Ltd, 99, Chive Street, Calcutta.

1292 A P K Surat—Banana powder is used as food for infants and invalids

1293 K B Faizpur—Matches are manufactured by Adachi Y N Kaisha, 43, Nishimachi, Kobe, The British Trading Co, 15, Ginza Nichome, Kyo-bashi-ku, Tokyo; Chugai Shoko Kabushiki Kaisha, Tosabor, Osaka and International Trading Corporation Ltd, 13, Nichome, Nakanoshima, Osaka, all of Japan. Process of preparing glass appeared in December 1925 issue of **Industry**.

1295 V R M Lahore—Carnauba wax may be bought of S N De, P O Box No 7851, Calcutta

BOSE & COMPANY

General Order Supplier & Dealers in:

All sorts of Canes, Bamboo Root Polo Balls & Raw Products & etc The best house for placing orders. If you are in need of anything please to book your order with

BOSE & COMPANY,

23 Ram Rattan Bose Lane, Shambazar, Calcutta.

1296. E. B. B. C. Calcutta.—Formulas of inks will be found in June 1923 and March 1925 issues of *Industry*.

1297. J. S. S. Fategarh.—For learning mechanical and electrical engineering you may try Bengal Engineering College, Shibpur, Howrah; Bengal Technical Institute, Jadavpur, 24-Parganas; Benares Hindu University, Benares, and V J Technical Institute, Bombay.

1299. N H M Bhavnagar.—For printing tins you may write to the Calcutta Tin Printing Works, Post Box 6772 and Indian Colour Printing Works, 243, Upper Circular Road; both of Calcutta.

1300 F C. Begusarai.—Sunlight soap may be supplied by M. Framrose & Co., 9, Bank Street, Fort, Bombay. German lanterns may be bought of G F Razec & Co., 111, Radha Bazar Street, Calcutta. For Calvert's carbolic soap enquire of Smith Stanistreet & Co., Dalhousie Square, Calcutta.

1302. P. A. Karachi.—Try to get your son admitted in Deaf & Dumb School, 293, Upper Circular Road, Calcutta.

1303. S. A. C. Shanmuganathapuram.—Confectioneries may be supplied by Ardeshir Rustomjee, Parsee Bazar Street and Mongini Ltd., 11/19, Church Gate Street; both of Bombay. Tea and coffee may be had of Lipton Ltd., 33, Apollo Street; Polsons Ltd., 115, Frere Road and Brooke Bond Tea Co. Ltd., Holland House, Colaba, Causeway; all of Bombay. Paper and stationery articles may be supplied by Bombay Stationery Mart, Victoria Bldgs., Parsee Bazar Street, and Siraj & Co., Parsee Bazar Street; both of Bombay. Hardware may be bought of E. A. Currim, 97, Apollo Street, and T. Hirallal & Co., 242, Nagdevi Street; both of Bombay. Paints and varnishes may be had of Pioneer Indian Paint & Oil Works Ltd.,

WANTED

Buyers for our New and Second-hand books, offered at greatly reduced prices. Many rare and interesting works. Select authors. Unusual subjects. Suitable for all. Usual discount to Booksellers and Libraries. Bargains Catalogue free. **MILTON & CO.,**
Books—By—Post System,
Matunga, Bombay 19.

Near Byculla Bridge, Byculla and West Indian Import & Co., 29, Dalal Street; both of Bombay. Lanterns may be had of G. I. F., Razek & Co., Lohar Chawl Street, Bombay. For chimney enquire of Paisafund Glass Works, Talegaon, Dabhada. Wants to be put in touch with bead dealers of Bombay.

1304. M. N. S. S. Madura.—Recipes of dyeing yarn appeared in August and September 1925 issues of *Industry*.

1305 C R. D. Naokhali.—For manufacturing inks Mitchel's book is the best. Magenta may be bought of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Gallnuts may be had of Madhab Chandra Daw, 4, Armenian Street, Calcutta. A formula of blue-black ink will be found in June 1923 issue. You should use pure chemicals. A book on ink manufacture is going to be published very shortly from this office.

1307 C S. M. Lyallpur.—For fertilisers try Chilean Nitrate Committees, Post Box No 469, Calcutta. An article on manure appeared in July 1926 issue.

1508 D. H. S., Karwi.—Christmas cards, calendars, etc., may be supplied by Moderner Kunstverlag G m b H., Berlin, S. W. 68, Germany and Richard Keutel, Kunstanstalt, Lahr (Baden) Germany.

1309 V. J. M. Bilimora.—Wants to be introduced to rice and pulse exporters of Bombay.

1310 G. C. J. Nagpur City.—We do not deal in any article. We only furnish information to our constituents. For soap stamping moulds enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

1311. M. L. B. Bundi.—Process of preparing alloy of copper and antimony appeared in July 1926. Antimony is a metal while antimony hydride is a salt of antimony hence these are not one and the same thing. Hindi equivalent of antimony is not known.

1312 T. K. B. Surat.—You may gild silver thread by dipping, the process of which appeared in April 1923 issue.

1313. M. L. Karnal.—Refer your query to a veterinary surgeon.

1318. C. V. R. Vizianagram.—For picture postcard refer to No. 1308 above.

1320. N. R. Bangalore City.—For hosiery goods enquire of E. B. Bros. & Co., 11, Dharamtolla Street, Calcutta.

1321. M. T. Thayetmyo.—Refer your query to the Consul-General for Germany, 2, Store Road, Ballygunge, Calcutta

1322. S. D. M. 9, Java Street, Kula Lumpur.—Bela oil is a kind of floral oil prepared from Arabian Jasmine.

1326. P. S. Papun.—Process of preserving potatoes appeared in June 1926 issue. No artificial means will be required for preserving onions. A formula of blue-black ink appeared in June 1923 issue. Ink pots of required description may be had of P. S. Dutt & Bros., 8, Ezra Street, Calcutta.

1329. P. C. A. Bombay.—No substitute of ferrous sulphate will act similarly. For ink manufacture you may wait for the book on ink manufacture to be published shortly from this office.

1330. E. C. Tanjore.—Match splints and veneers may be supplied by Bhawani Engineering & Trading Co., 122/1, Upper Circular Road and Bengal Small Industries Co., 91, Durga Charan Mitter Street; both of Calcutta. Match chemicals may be bought of Champaklal Bros., 72, Canning Street and C. Biswas & Co., 125, Bow Bazar Street; both of Calcutta.

1331. S. R. C. C. Amraoti.—You may go through Soap Manufacture by Hurst to be had of Chakraverty Chatterjee & Co., 15, College Square, Calcutta.

1332. M. A. C. Rangoon.—Wants to be put in touch with makers of wonderful mystic ring and Sirdar's charms and specialties.

1335. T. R. B. Amalner.—For gramophones of required description write to Humig G. m. b. H., Lindowerstrasse 18-19, Berlin, Germany. Your other ideas are impracticable.

1339. M. R. K. Mainpuri.—Wants to be put in touch with wholesale dealers in betel nuts of Calcutta, Karachi and Cawnpore.

1340. K. B. Faizpur.—Preparation of artificial essential oil is not possible. For electric pocket lamp boxes and carbon cells enquire of Elektrawerk Gebr. Rilling A/G, Dusslingen 8, Wurttbg and Theodor Eifflander, Koppenickerstrasse 154-a, Berlin S. O. 33; both of Germany.

1341. A. Q. N. Tenali.—We have no book on soap manufacture; you may however go through Soap Manufacture by Hurst to be had of Chakraverty Chatterjee & Co. Ltd., 15, College Square, Calcutta.

1342. P. D. Narshinghpur.—Refer your query to The London Homeopathic Hospital, Great Ormond Street, Bloomsbury, London, W. C. 1 and the British Homeopathic Society, Queen Square, Bloomsbury, London W. C. 1 There is no such man known to us.

1343. B. B. S. K. Karachi.—Hindi equivalents of the chemicals mentioned by you are not known. Preparation of litharge is given in July **Industry** 1926. Fire clay is not the same thing as burnt clay. There is no such thing as camova wax Kerosene means the oil. Ordinary magnesia should be used Vienna lime and paste are different things. Whiting is made from powdered chalk. For pure metals write to C. Biswas & Co., 125, Bow Bazar Street, Calcutta.

1346. K. P. B. Dhandhuka.—There is no other journals dealing with trade and industry like **Industry** and **Commercial India** in our country You may start a printing press on a small scale with Rs. 3,000 as an initial capital. In printing tri-coloured blocks three sets of blocks are printed one after the other. Process of silvering mirrors appeared in December 1925 issue. Process of preparing artificial slates appeared in April 1924 issue. For books on

FOR PUJA AND DEWALI

Manufacture Magic Wire and Pharaohs serpents under your own label by getting from us Magnesium wire in oz rolls at Rs 14/- a lb., and serpent sticks at Rs 7/- a lb., Postage Extra. Samples at Re. 1/- an oz, and Annas eight an oz. respectively

DURBAR TRADING & MANUFACTURING CO.
Katra Nihal Singh, AMRITSAR.

commercial subjects enquire of Kamala Book Depot Ltd, 15, College Square, Calcutta.

1348. P. D. G. Gangajalghati—Filter paper is a kind of blotting paper. This may be had of Ghose Bros, 63-J, Radha Bazar Street, Calcutta. There is no difference between absolute alcohol and rectified spirit. Flavour of alcohol is due to special preparation. For rose otto try Paradise Perfumery House, 75, Colootola Street, Bombay.

1349. M. R. Bombay.—For further particulars of dairy farming write to Mr Saiyid Zabiruddin Haider, Shahabad, Collectorate, Arrah.

1350. D. C. Sind—Colours may be bought of H. R. Mody & Co, 10, Fida Bldgs, Princess Street, Bombay.

1351. D. D. Bangalore City—For textile machines try Textile Machinery & Stores Co, 61, Apollo Street, Fort, Bombay.

1352. K. M. D. Bombay—Aerated water making machines may be had of Ammichand Mehra & Sons, 34, Armenian Street, Calcutta and Little & Co, 3, Grants Lane, Calcutta. The above firms will also supply you with soda water bottle.

1353. S. V. R. N. Persia.—Process of flavouring beer appears in this issue.

1354. G. B. B. S. Sailkot City—Your name has been entered in our directory.

1355. K. P. K. Poona City—Process of preparing artificial ghee appeared in June 1926 issue. For manufacturing perfumed oil you may go through the booklet Hair Oil Manufacture published from this office. A good recipe of tooth powder will be found in March 1925 issue. Recipes of Tambul Bilas, etc. will be found in December 1925 issue. Silk cloths may be

supplied by Silk Institute, Bhagalpur; S. S. Bagchi, Khagra, Murshidabad, and Maniram, Harijwanram, Gaighat, Benares City. Your other queries will appear in an early issue of **Commercial India**, the sister journal of **Industry**. Wants to buy conch shell.

1357. A. N. V. N. Madura—Gold threads are manufactured by Madhavlal Benilal, Chowk, Benares; Gentley Premier Gold & Silver Thread Factory, Delhi and Indian Gold Thread Mills, Manavaram, Chingleput. These may also be supplied by P. Gubout, rue Montinatre 160 and J. Yanthelme, rue des Jeuneurs 35; both of Paris, France.

1359. N. K. H. Cawnpore—You may try with a little quantity of logwood extract in order to ascertain the exact measurement of the ingredients to be used.

1361. R. R. D. Morbang—Lemon seeds may be bought of Nurjehan Nursery, 9, Kankatgachi Lane, Calcutta. Tin can making machines may be supplied by Bhatia Ahmed Abdulla & Bros, Old Market, River Road, Karachi. Sesamum oil may be had of Anath Nath De, 3, Madaputty, Bara Bazar, Calcutta. Wants to be put in touch with suppliers of pig or boar.

1364. V. T. J. T. R. Parvatipuram—Fire works may be bought of Orient Fire Works, 85/1, Upper Circular Road, Calcutta.

1365. S. C. R. Naria—Process of preparing dry batteries appeared in November 1925 issue of **Industry**.

1366. S. K. M. Bombay—Mr K. Banerjee, Post Box No. 532, Calcutta is a distributor of many printing machines. For translating into different languages enquire of The Eastern Bureau Ltd., Bureau of Universal Information, 5, Royal Exchange, Calcutta. There is no such directory known to us. The following is a list of some of the directories published in India and foreign countries: Ferguson's Ceylon Directory published by the Ceylon Observer Ltd., Colombo, Ceylon; The Southern Indian Commercial Directory, V. Rajagopalier & S. Ranganathiyence, Commercial Directory Office, Ernakulam; Commercial Directory,

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Bagdad-Basrah Government Press, Bagdad; Thacker's Indian Directory published by Thacker Spink & Co., 43, Esplanade East, Calcutta; The Indian Mercantile Directory published by Laxmichand Dossabhai & Bros., Rajkot, Kathiawar; London Directory, 25, Abchurch Lane, London E.C. 4. and Kelly's Directory Ltd, 182/184, High Holborn, London W. C. Seele legal advise.

1367 R. K. T. Srinagar.—Cups of porcelain may be supplied by Calcutta Pottery Works Ltd., 45, Tangra Road, Calcutta; Sorab Dalal Tile Works, Kathiawar, Mukherjee's Oriental Fine Art Syndicate, 23, B. K. Mukherjee's Street, Uttarpara and Talegaon Glass Works, Talegaon, G. I. P. Ry

1368 K. D. Raipur.—For second-hand motors, enquire of Biswakarma Agency, 84-A, Clive Street, Calcutta

1369 L. A. K. Savantvadi.—For foreign journals enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta. We cannot venture any opinion unless we see the ingredients used

1370 R. B. Benares City.—Refer your query regarding rare plants and seeds to Indian Agri-Horti Society, Alipur, Calcutta and S. N. De, Post Box No. 7851, Calcutta. Tallow may be bought of Calcutta Tallow Mart, 19, Tiretta Bazar Street, Calcutta. White turpentine may be bought of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For registration enquire of P. Lodge & Co., Post Box No. 6772, Calcutta

1372 P. D. G. Gangajalghati.—For indigenous perfumes enquire of B. K. Paul & Co., 113, Bonfields Lane, Calcutta. Uncover the vessel at intervals and see whether the water has been reduced to the required consistency. An article on distilling appeared in July 1925 issue. Stoppered phials may be bought of P. S. Dutt & Bros., 8, Ezra Street and S. K. Dey & Co., 124, Shova Bazar Street; both of Calcutta. Aluminium vessels may be bought of Jeewanlal & Co., 55, Canning Street, Calcutta.

1373 R. S. S. Rayakamangalam.—Wants to know the full address of the Star Bros., Bell Co. of U. S. A. For cycle parts and accessories enquire of S. N. Bhattacharjee & Co., 5, Dharamtola Street, Calcutta.

1375. S. K. J. C. Madras.—All the addresses you require will be found elsewhere in these columns.

1378. G. C. M. Dacca.—Process of preparing alcohol appeared in December 1925 issue under the article Brewing and Malting. It is not possible to manufacture alcohol without machinery.

1381. N. V. R. K. R. Pedapatanam.—For lithographic cardboard boxes enquire of Calcutta Fine Art Cottage, 70, Dharamtola Street, and Bengal Cardboard Box Co., Mechua Bazar St., both of Calcutta. Telegraphy cannot be learnt at home. For glass bottles write to United Glass Bottle Manufacturers Ltd, 40/43, Norfolk Strand, London, W. C. 2, Mizuchi & Co., 75, Nichome, Kilakynhoi-machi, Higashi-ku, Kyoto, Japan, Kasai Brothers & Co., 2, Ichome, Sannomyacho, Kobe, Japan and Imperial Glass Co., Bellare Ohio, U. S. A. Wants to be put in touch with dealers in coatings and shirtings in Calcut and Cannanore

1382 D. P. S., Nawabganj.—Silver is obtained from mines in combination with other minerals from which it is extracted. Process of preparing candles appeared in April 1925 issue

1383 S. N. H. Z. Nether.—Your queries are not in our line

1384 N. K. S. Atara.—For learning tailoring by Maharaja Cosm Bazar Polytechnic Institute, 1, Nandalal Bose Lane and Calcutta Commercial Coaching Institute, College Street Market, both of Calcutta

1385 T. R. G. Poona City.—It is not possible to make kerosene oil smokeless without undergoing processes involving use of many machine. White oil may be had of Anath Nath De, 3, Moudaputti, Bara Bazar, Calcutta.

MAKE TRANSPARENT ENVELOPES

"Temperol" Varnish applied with brush makes any Envelope Transparent. Also gives a film like surface to Posters and Pictures for night advertisement. No need to paint on glass. Price Tin 1 Pint with Stencil & Brush Rs. 2/- each. V. P. charges extra. Agents Wanted to sell our other specialties.

THE ENGINEERING SPECIALTY CO.,
P.O. Box No. 124, Bombay.

Process of blending tea appeared in July 1925 issue. For manufacturing hair oils go through the booklet Manufacture of Hair Oil published from this office. Chemicals may be bought of B. K. Paul & Co., 113, Bonfields Lane, Calcutta. Your all other enquiries are unintelligible.

1387. M. R. P. Modalooru.—An article on removing all kinds of stains from cloths will appear in an early issue. Soap stone is used in adulterating soap to the extent of about 10 per cent. It is better to use white glue. Menthol is the principal constituency of all varieties of peppermint oil which is obtained from a herbaceous plant of the same name. The spirits named by you differ from one another. The density of a caustic lye is measured by a hydrometer known as Beaume's.

1389. B. T. N. Megaravalli.—Process of manufacturing biscuits will be found in February 1925 issue. Biscuit making machines may be supplied by Pembroke D. Harton Co., Inc., Philadelphia, Pennsylvania, U. S. A. and Gierner & Sohn, Hamburg, Germany. Refer your query regarding B. A. examination to the Registrar, Nagpur University, Nagpur, C. P. For magic lanterns enquire of Mahomedbhoy Jivabhoy & Co., Nizam Street, Bombay 9.

1392. S. V. R. Tuni.—A practical book on Ink Manufacture is going to be published very soon from this office; it contains many recipes of ink powder.

1393. S. P. P. Kadiri.—Thread ball making machines may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lal Bazar Street, Calcutta.

1394. M. J. V., Bombay.—You may go through December 1925 issue of *Industry* which deals with the unemployment problem and suggests means of various kinds. You may also start agency business for which you are referred to the Sale Exchange pages of *Industry*

where you will find many firms advertising for securing agents.

1396. U. K. K. P. Pollachi.—Jute may be bought of J. K. Bose & Co., 158, Aheritola Street; Doulat Ram Rawat Mull, 178, Harrison Road and Currimbhoy & Co., Ltd., 33, Ezra Street; all of Calcutta.

1397. M. C. J. M. Madras.—Wants to be put in touch with dealers in Madras curry powder of Bombay, Calcutta, Rangoon and Colombo.

1398. V. E. P. Tinnevely.—Jeweller's tools may be supplied by L. Basack & Co., 5, Old Court House Corner, Calcutta. The following are some of the jewellers of Calcutta: Benud Behary Dutt, 11A, Bentinck Street; Ghose Bros., 114, College Street; B. Sirkar & Sons, 131, Bow Bazar Street and Ghosh & Sons, 16/1, Radha Bazar Street.

1401. G. L. (no address).—Practical training is imparted in The Mission Poultry Farm, Etah, conducted by the Government.

1402. A. C. S. Bombay.—Corns on toes may be cured by "Chiroprodium" to be had of Smith Strangstreet & Co., Dalhousie Square, Calcutta. You can learn every thing about mail order business if you go through the book Money Making by the Mail published by this office. A formula for face cream appeared in July 1924. Articles of furniture are polished by shellac varnish of good quality. Rolled gold articles are rolled over with genuine gold leaves while gold is electrolytically deposited on gold plated articles. Wants Soya Bean

1406. B. M. J. Radhanpur.—Books on physical culture can be had of our advertisers Mohontosh Brothers, College Square, Calcutta.

1410. R. F. Partabgarh.—Wants to dispose of old gunny bags.

1411. D. T. Anantpur.—Logwood is employed for black while Brazil wood is employed for brown or red. Most probably you have confounded the two. The latin name of logwood is *Lignum Comfenchenses*.

1413. P. N. S. Ganjam.—Wants addresses of Messrs. H. C. Kurz of Bombay and of the agent of Himalaya Pencil of Bavaria.

ACCOUNTANCY

London Diploma Examination in December
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POSTAL COACHING OFFICE,
Paithankar,
POST JUNNAR, (Poona.)

1414. N. P. L. Rohri.—For books on laundry try Messrs. Chakraverty Chatterjee & Co., College Square, Calcutta. Estimates for starting small laundry works may be furnished by The Oriental Machinery Supply Agency, Ltd., 20/0, Lall Bazar Street, Calcutta. A recipe for bleaching yarns is appearing elsewhere.

1415. M. Z. P. Gadag.—Camphor may be had of Madhab Ch. Daw, Khengraputty, Bara Bazar, Calcutta.

1416. N. S. Raichur.—Most probably the oak wood folding camp furniture are imported. Wooden sporting goods may be polished with varnishes to be had of Mohim & Co., 44 Beadon Row, Calcutta.

1417. M. B. Kemmendale.—Old gramophone records cannot be renovated.

1419. E. S. W. Nagpur.—Picture post cards may be had of any of our advertisers or from Majumder Agency, 64, Machua Bazar Street, Calcutta.

1421. R. G. G. Ahmedabad.—The Advance Auto Engineering Works, 75 & 76, Bentinck Street, Calcutta will teach you motor driving. You may serve as an apprentice in any watch repairing firm of the locality.

1423. D. H. C. Karachi.—Hints on the manufacture of all kinds of ink mentioned by you will be found in the Book on Ink Industry to be shortly published by this office. The two chemicals mentioned by you are quite different from each other. A formula for pain balm appeared in January 1926 issue of Industry. Gum bottles may be had of S. K. Dey, 124, Sova Bazar Street, Calcutta.

1424. C. L. G. Bareilly.—Sital Pati may be had of National Stores, Mirzapur Street, Calcutta.

1425. A. C. Travancore.—Palmistry Self-taught by R. P. De is a good book on the subject.

1426. M. S. L. S. Agra.—Bones may be softened by soaking them for 3 or 4 days in a solution of 1 oz. of spirit of nitric acid in 5 oz. distilled water. They cannot be melted.

1427. C. S. R. Nadia.—Read Hair Oil Manufacture, a good book published by this office.

NOTICES & REVIEWS.

A Hurricane Lantern.

One of the latest productions of the Oga Glass Works Ogalewadi, Dist. Satara, Anush State is the Prabhakar, a hurricane lantern. It gladdens our heart to find it at least equal in quality and finish if not superior to foreign make. We wish the enterprise the success that it richly deserves and strongly recommend it to our readers.

Ringworm Ointment.

We have received sample of Goyal Ringworm cure from Messrs S. Goyal & Co., Karaoli, Agra.

Tooth Powder.

We have received tooth powder prepared from precipitated chalk by The Petlad Turkey Red Dye Works, Petlad, Baroda.

Printed Tin Boxes.

Nice tin boxes, attractively printed in colour are being turned out by the Calcutta Tin Printing Works, Post Box 6772, Calcutta, who are in a position to supply all kinds of tin containers for the trade. They have also made a speciality of calendars printed on tin.

Hair Oil.

Of the toilet articles manufactured by Pt. Gayaprasad Mathuraprasad Pathak, Dist. Mandla, C. P. mention should be made of Vishwa Mohini Hair Oil and Chandraprobha Hair Oil and Monoj Hair Oil. These have been prepared with the help of the book published by this office and are charmingly coloured and pleasantly perfumed. Sample of his Sulemani Salt has also been received.

Boot Polish.

"Asbi" is the name of a German made boot polish placed on the Indian market by Messrs. Austin & Co., 27, Maliban Street, Colombo. It is of good quality.

Book Binding Leather.

Leathers of superior quality are tanned by United Muslims Trading Co., Commercial Buildings, Dindigul, S India. Judging from the samples before us we cannot but speak highly of the book binding leathers of which they have made a speciality. We would like to see these widely employed as the prices are moderate.

Business Service.

The object with which Indo-Foreign Commercial Intelligence Corporation, Post Box No 485, Bombay, has been formed is a laudable one. It will seek to safeguard the interest of the commercial communities throughout the world. Those who meet with difficulty in business relations may require such service.

Industrial Training.

It would appear from the prospectus of Dr Enad's Industrial College, Lahore, that the institution has been started to offer the unemployed an opportunity of being trained in many useful industrial arts. For further particulars our readers should write to the Principal.

A Sound Insurance Concern.

From a perusal of the Annual Report we are convinced that The India Provident Company of 29, Grey Street, Calcutta, is one of the most stable insurance concerns. The record of progress of the company reflects great credit on the management and the policy holders are to be congratulated for making a judicious choice. Another noted for its feature is that the matured policy holders have been sanctioned the refund of 25 per cent of the total premiums paid by them as additional bonus and this action of the management is highly commendable. We wish this company more success in future.

TRADE ENQUIRIES.

[To communicate with any party write him direct with name and address as given below, mentioning *Industry*.]

1360 Dare, 182, Main Street, Kangaroo Point, Brisbane, Queensland, Australia. Wants to be introduced to dealers in Indian hand-made lace, embroideries, chiron work, silver, brass and lacquer wares, toys, deer and leopard skin, Himalayan furs, gold bordered black table cloth and other Indian curios.

1493 Gumbir & Sircar, 10, Sukeas Lane, Calcutta—Want to be put in touch with manufacturers of ringworm ointment, tooth powder and other small industries.

1527 Dr. Rebati Mohon Chakravartty, Shannogor, Nadia—Can supply bakash bark, hazel nut and all sorts of animal hair.

1581 Sh. Noor Din Feroze Din, Raheen Yar Khan, Bahawalpur State.—Can supply lizard skins in large quantities.

1652 Thomas Rodrigo, Kochikadde Street, Colombo, Ceylon—Wants to be introduced to suppliers of beeswax and myrobalans.

1661 Trachil Varkey, Angamali—Can supply lemon grass oil in very large quantity.

1668 Ramesh Chandra Saha, 191, Kanku gachi Road, Calcutta—Can supply a large number of pine-apples.

1672 R. M. Kochhar & Co., Raisina, Delhi.—Desire to be put in touch with suppliers of stag horns, single and with skulls, elk-horns, single and with skull, roebuck-horns, single and with skull, deer teeth, etc.

1677 Sharma Bros., Bikaner—Want to be put in touch with dealers in peacock's feather.

1703 G. M. Khan & Sons, 11, Tiljala Road, Calcutta—Desire to be introduced to suppliers of beeswax, ox gall, ivory, rhino horns, bear's bile, agar wood, chalmogra seed, tortoise-shell and m.o.p. shells.

1710 Ashta Ratna Tuladhar, 4011, Upper Chittpore Road, Calcutta—Wants to be put in touch with dealers in raw wool.

SEPTEMBER ISSUE OF INDUSTRY.

(In the Press.)

The September issue of *Industry* which will be a Special Number and appear on the last day of the month will contain among others interesting articles on pyrotechnics in addition to the regular features such as India's Industrial Progress, Scientific Topics, Small Trades, Formulas & Recipes, and Brief Queries and Replies, etc. Any friend of our subscribers may get a copy free as sample on application to the Manager, *Industry*, Shambazar, Calcutta.

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Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

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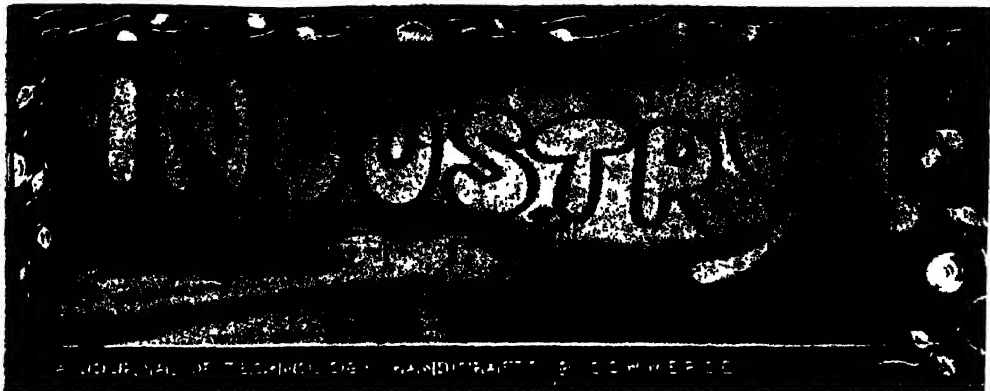
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 Etc., Etc.
And 50 Model Letters



VOL. XVII.

CALCUTTA, SEPTEMBER, 1926.

NO. 198.

OCTOBER---THE HOLIDAY MONTH.

The country is on the threshold of the holiday month--the month of goodwill, of fidelity, of piety, of mirth and of enjoyment.

But this year October is an exceptional month. What we lost in April and May in the waves of communal strife must be made up in October.

We have weakened ourselves by fraternal quarrels, made our country laughing-stock of the world, compelled our workers to suffer for no gain, put our pioneers on disappointing confidence: we cannot take life easy this month--cannot take it as a holiday month.

In this month of universal fraternity let us put ourselves to added energy, let us protect ourselves from pernicious influences and face the future with courage and a spirit of independence and self-help let us show ourselves up in united strength.

Let not our incapacity to independent work, our moral narrowness, the malignant diversity of our purposes, our negligence to work with joyful energy for the common good of the countrymen--deter us from our purpose.

Let not the influence of time and the demand of the suffering countrymen for united action fall flat on deaf ears.

Every one of us--big or little, can do something extra. Every one can put his personal output up 25 per cent.

THE TIDE OF OPTIMISM.

SUCCESS in industry necessarily implies a large amount of judicious optimism, and the man who goes through life complaining that times are bad and likely to become worse is generally foredoomed to failure. An ability to look on the bright side is one of the happiest traits of human nature, and is almost always found in the successful businessman. It may, of course, be argued that the wish is often father to the thought, and this is perfectly true, but the fact remains that much has been accomplished in the industrial world because active men determined that business should be made to exist even where it was by no means apparent. Hence it comes about that, on occasions when some expression of opinion as to future prospects is called for, the hopeful industrialist is apt to make the best of the existing state of affairs and to foresee better times in the future.

Thus it is that the hopeful man, the enthusiastic man, the man who thoroughly believes in the soundness of his proposed course of action and in his ability to follow it, who wins out. Consciously or unconsciously, he exercises an important psychological effect upon others with whom he comes into contact, he radiates his cheerful, confident personality, he communicates his enthusiasm to others. The pessimist, the doubter, has no sound place in business or industry, such qualities as he has are negative; they do not make for progress.

The real difference between those who succeed and those who do not is that one thinks he can, and the other thinks he cannot. The one discovers himself, and the other does not. The one learns that he can do things, and the idea rouses, thrills and inspires him. The other thinks that all the great things were intended for somebody else, so he

misses the great experience, the great trials, and the great rewards. In short the one vacillates because of his innate pessimism while the other evinces unflinching faith in his optimism.

Leisure time in the career of a business man is comparable to the tides in the course of a river. When something goes amiss with him he broods over the affair the whole period without thinking out any solution. He shuns the company of his colleagues. His spirit is dejected. This is the ebb-tide in his affairs. If, on the contrary, every thing passes smoothly he makes merriment. He schemes for development. Better prospects and bigger profits are conjured up before his eyes. This is flow tide with him.

And as a river overflowing its banks in flood tide washes away the accumulated filth and leaves a silt of rich soil in its recoil so the optimistic man enthuses the brooding persons who happen to come in his contact. He carries every thing before him and reaches the goal.

Of all times the Dusserah is the season of optimism. During this well-earned leisure period one has ample opportunity to hold a stock-taking not of the material business but of the mental attributes. Instead of idling away the time the pushful reader of *INDUSTRY* may ponder over the works and turmoils of the past year and derive lessons from the achievements and failures to justify his optimism. If, however, his balance-sheet is not satisfactory he can easily make friends with those who can cheer him up in the fulness of the joy of their success.

And *INDUSTRY* is always ready to befriend you. In sending you out hearty felicitations of the season we hope to impart to you an abundance of optimism which is the most potent creative force in this world.

THE PRINCIPLES OF PHOTOGRAPHY.

PHOTOGRAPHY is the art of obtaining images by the chemical agency of light upon sensitive surfaces. Photography is based on the same principles which can be seen in our actual perception of natural objects like the hills and the seas. The rays of the sun which fall upon an object are reflected back into our eyes and form an image of the object upon the "retina" or the "yellow-spot". Similarly if rays from an object are allowed to enter through a pin-hole in a piece of cardboard, they are found to form an image of the object upon a screen held at some distance from the pin-hole at the back. If these rays coming through a pin-hole are taken upon a photographic plate, they will be found to give as good results as are expected from a camera equipped with a lens. Lenses are made use of in a camera in order to give an image with clear-cut outline and to intensify the rays that pass through them.

Having thus secured a lens we should try to get an impression of the rays from an object which pass through the lens on some 'screen.' For this purpose use is made of the fact that nearly all salts of silver are affected by light. The most commonly used is silver bromide while silver chloride is occasionally used for high class work. The photographic plate is made of glass coated on one side with an emulsion of the following ingredients:—

(i) Gelatine, soft or hard; (ii) Ammonium bromide, (iii) Potassium bromide, (iv) Silver nitrate, (v) Alcohol, (vi) Liquor ammonia and (vii) Distilled water. The emulsion is coated direct on the plate without any previous lining. Two things will have to be noted with regard to the above emulsion:—(a) The "rapidity" of the plate depends upon the gelatine used. Hard gelatine makes the plate slow. (b) In the ingredients we do not apparently notice silver bromide which plays the trump card. It is formed by the double decomposition of silver nitrate and potassium bromide.

Since silver bromide is sensitive to light there is a difficulty in that the plate must be handled in a pitch dark place. It is found that red light does not affect the silver bromide and hence only red lamps are used in the dark rooms. The question then naturally arises as to why red light does not affect the silver bromide. We know that the light passes through a glass prism and is split up into seven different rays (or for short as "vibgyor"). If we scrutinise the spectrum thus formed we find that the coloured lights are deviated in dif-

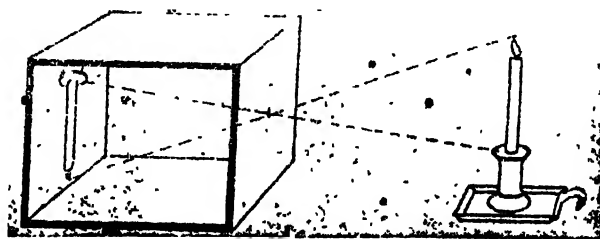


Fig 1 Pin-hole Camera

ferent ways—violet rays deviate more than the red. Hence the index of refraction of the prism is greater for violet rays than for red rays. It is moreover found that some of these lights of various colours have different kinds of properties. For instance, red light has more heating power than violet light which has none at all. Now the kind of light that has the power of causing chemical changes—which is the light we see specially by and the light we photograph by—is mainly the violet light or violet part of the white light. (The ultra-violet rays are often times called the "Chemical rays"). Red light, therefore, has practically no influence on photographic plates.

The plate then in the loaded camera is ready for an exposure. The time for which the lens is kept open before the object depends upon the lens, the rapidity of the plate and the intensity of the light that falls upon the object.

Now there remains the operation in which chemical action plays a greater part. It can be divided into two stages; (I) Preparing the negative which includes (i) developing, (ii) fixing and (iii) washing; and (II) Preparing the picture which includes (i) printing, (ii) toning, (iii) fixing, and (iv) washing. (Occasionally toning after fixing is recommended on account of the loss of tone in the fixing bath after toning. Also some people recommend fixing before developing especially when on tour).

DEVELOPING :—When the exposed plate is taken out of its cover nothing will be seen upon it before development

Before taking the plate out of its cover in the dark room it is advisable to prepare a solution of certain chemicals in water to form the developing solution

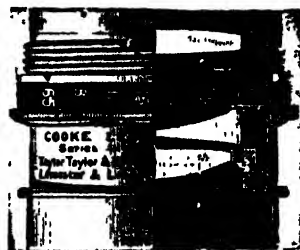


Fig. 2. Complicated Lens.

technically called the "developer." The real meaning of developer is an agent used to render visible the latent image, or, in technical language to reduce to silver or other metal the latent image produced by the action of light upon the sensitive salt.

The composition of the developer varies with each worker. In addition to the developing agent the developer contains an alkali in order to increase the reducing power of the developing agent proper; and for this reason the photographer calls the alkali an "accelerator." The alkalies generally used are sodium hydroxide, potassium hydroxide, sodium carbonate or potassium carbonate. The second substance added to the developer prevents the action of the atmospheric oxygen on the solution and is called the "preservative." It is usually sodium sulphide while potassium metallic sulphide is occasionally used also.

The temperature of the developer should be between 65° to 70° F as a cold solution acts slowly while a hot one

softens the gelatine of the emulsion and "fogs" the plate.



Fig. 3. Developing.

The following is the formula of the most conveniently used developer:—

I Developing agents,

(i) Hydroquinone—30 grs., (ii) Metol—10 grs.

II Preservative—Sodium sulphide—350 grs.

III Accelerator—Sodium carbonate 350 grs. Water—10 oz.

In addition to these, use of 5 grs. of potassium bromide is recommended to control the action of the developer and keep the negative clear. The reason why two developing agents are used is that hydroquinone gives density and metol helps the negative to appear in details.

When the above developer is prepared the exposed plate is put in a porcelain dish with coated side upwards and then the previously made developer is poured in it in one quick sweep. If any air bubbles are formed they are broken gently by fingers. Then the dish is

rocked from side to side to ensure entire flow of the developer all over the surface of the plate. The brightest parts such as sky and white dresses appear first. Development is continued for 2 or 3 minutes more even after the appearance of the image so as to add density to the negative.

If the plate is under-exposed the image develops very slowly, or only the high lights appear while the halftones and shadows do not. For complete development 10 minutes are required but if, say after 15 minutes, nothing, or very little, appears on the plate, try breathing on it, or warm the developer slightly, care being taken that the film does not melt. If even then nothing appears the plate may be thrown away as being useless.

If it is known before developing is commenced that the plate is over-exposed a little extra potassium bromide added to the developer will save the plate.

Subsequent processes include a minute's rinsing in cold water, and transference, creamy side uppermost, to the fixing bath, in which the plate remains for a time twice as long as that occupied by the whiteness in disappearing. Then the fixed plate is brought out of the dark room for washing.

FIXING:—Even though the exposed plate is developed there is a large amount of silver on it which would be acted upon by light if brought out and will damage the developed image. The process of fixing is the removal of the sensitive salt unacted upon by light, or by the developer, thus rendering the negative unalterable by further action of light.

Thus it is the unaffected silver bromide that has got to be removed. There are several solvents which can dissolve unreduced silver. Hypo (sodium thio-sulphate) has the greatest solvent action except ammonium hydroxide which for many reasons is not advisable to use. Although many solvents are known, ammonium hydroxide, potassium cyanide and hypo are the most useful. Ammonium hydroxide is not practicable because to remove the superfluous silver quickly very strong solution must be used and such a solution seriously damages the gelatine. Potassium cyanide is too costly and in addition is undesirable because of its exceedingly poisonous nature and its liability to eat into the half-tones.

All things being considered nothing is so good as hypo. The usual procedure in fixing is to place the negative, coating upwards, in a dish full of hypo solution, technically called the "fixing bath." The solution should be 4 oz. hypo and 16 oz. water. The dish here also, is to be rocked as was done in developing. While fixing is apparently the simplest of all photographic operations, it is frequently done in an insufficient manner. A negative is not fixed the moment silver appears to be dissolved and the plate becomes clear. The process of fixing with hypo includes two distinct and important functions. The first is the formation of a double salt by the reaction of silver bromide and hypo at which stage the negative is clear and apparently fixed. The double salt so formed is insoluble in water, and therefore cannot be removed by any amount of "washing," it cannot be seen but if the negative is

washed and dried at the stage the double salt will on exposure to light appear as a yellowish stain and in time the image



Fig. 4. Printing Frame,

will fade. The second function is the dissolving away of the detrimental salt first formed. Although insoluble in water a longer soaking in hypo converts it into another double salt which water will dissolve, hence the absolute necessity of leaving the plate in the bath for an additional time after the plate appears to the eye to be clear and fixed.

A solution of hypo will not attack the actual image which has been developed so long as the plate is well covered with the liquid, but when a negative wet with the fixing solution is exposed to the air, the hypo solution in conjunction with the oxygen of the air, attacks the developed silver which forms the image, with the result that the negative appears thinner. This action, however, takes place on a long exposure.

WASHING:—Negatives and prints that have been fixed in hypo must be freed of this substance by washing with water before they can be safely dried; otherwise the permanency of the negative is impaired. The usual process is to keep the negative in a dish and then water is

allowed to trickle over it for an hour. Hypo being of greater specific gravity than water, it follows that as part of the washing water removes hypo from the plate and "paper" it forms a solution denser than plain water and therefore tends to sink to the bottom of the washing vessel.



Fig. 5. Negative.

The time taken to wash a negative or print depends upon the method employed and upon other considerations. Complete removal of hypo from negatives requires about twice the time the plate takes to fix, in favourable circumstances. Negatives do not hold hypo as prints do, owing to the porous character of the paper of the latter.

Now when the plate is dried the negative is ready for printing the true picture on what are called the printing

papers. The amateur will find a big range of printing media on the market and he is to make his own selection. The royal road to obtain the best results is to follow the instructions of the manufacturers of the particular paper. There also, one is to make some alterations to suit the climatic differences. The sure way is to give trials in varying the time, for every operation, say in printing, fixing or toning.

There are two sorts of paper, one requiring daylight printing and the other artificial light. A good many papers require to undergo the operation called toning but another variety called the self-toning does not require toning since their emulsion contains the necessary toning ingredients. An emulsion of the following materials is coated on the well known Solio P. O. P. (i) Silver nitrate, (ii) Citric acid, (iii) Hard gelatine, (iv) Ammonium chloride, (v) Tartaric acid, (vi) Sodium bicarbonate, (vii) Alum, (viii) Alcohol and (ix) Distilled water.

But before printing if we look at the negative we will find black things like the hair appear white and white things like clothes appear black. The reason is too simple. We know that the rays of light incident on a white surface are totally reflected back and the rays incident on a black surface are "absorbed" in it and very little are reflected back. And hence, the rays act on the silver bromide of the plate from the white portions of the body to a greater extent than those from the black parts—in the latter case well nigh leaving that portion of the silver bromide unaffected to some extent.

In the process of printing the negative is pressed on the sensitive part of the paper (with the emulsion side of the negative in contact) in a "frame" specially designed for the purpose. The frame is then kept in daylight (but not directly under the sun) until the image on the paper is darker than desired. Thus the photo (positive picture) will be found having black things black and white things white.

TONING:—The prints are then washed for about 10 minutes and then transferred to the toning bath. Toning is an operation of changing the colour of a photographic image by changing its composition or depositing another metal. The makers invariably recommend a particular formula for toning. But as an example the following may be taken up.

Gold Chloride	2 grs
Ammonium	
sulphocyanide	20 grs
Water	16 oz.

Dissolve the sulphocyanide in 8 oz. of water first and then dissolve the chloride in the remaining water. Then add the chloride solution drop by drop to the sulphocyanide solution stirring all the while. This much solution will suffice for 25 prints of quarter-plate size. Toning shall be complete within 6 to 10 minutes. But during this period the prints should be kept on rapid move.

When this is complete the prints are well washed in fresh water and then fixed for about 10 to 15 minutes in a bath of $1\frac{1}{2}$ oz. hypo in 10 oz. of water. The prints are again finally washed and dried. The best method of washing prints is to immerse them in 10 or 12 changes of fresh water (every three minutes) taking care that each print is kept on the move during this period.



Fig. 6. Positive.

The other variety of paper, often called the gaslight, require artificial light for printing. When the paper is exposed in the frame no image will be seen instantly but will be noticed after development in a suitable developer. It is advisable to rinse gaslight paper between development and before transferring to an acid fixing bath. This should be done quickly to prevent any possibility of stains due to oxidation of the developer.

Here an acid fixing bath should be used in preference to the ordinary fixing bath. Hydrochloric acid suits the purpose very well. The prints are immediately immersed for at least two minutes in the bath and can afterwards be inspected. For it is within these two minutes that there is the possibility of some harm taking place. Fixing will be complete within a period of ten to fifteen minutes.

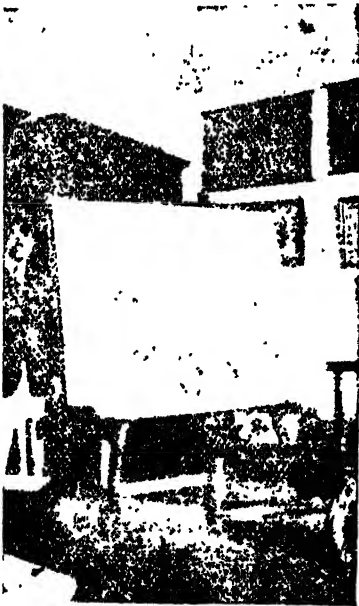
The subsequent processes of washing and drying, should present no difficulty.

--By Mr R. G. HARDIKAR.

SERICULTURE IN N. W. F. P.

AS I have been carrying on silk worm rearing operations in the N W F P for the last three years in succession, I wish to bring home to the public in general and commissioners in particular that in India excluding Punjab, Madras, Assam, Jammu, Patna, Kashmere, and Mysore States in which sericulture is already flourishing there are some parts where sericulture can make a headway with success provided suitable conditions are given and the State bestows special and favourable patronage. In fact it can become the chief source of income, benefitting both the State and the cultivators.

Kashmir and Afganistan on the other; its climate is just as suitable for silk-worms rearing as that of Kashmere and Afganistan. There this industry is carried on as a cottage industry and nearly every house rears a small quantity of silk worms. The staple food of worms is mulberry leaves. In this province there is no lack of the mulberry tree and more new ones can be planted as there are so many nurseries belonging to the P W D, Municipalities and District Boards. In my central place of silk-worm rearing, in Haripur Hazara District only, there are over thirty thousand mulberry trees well and ready for immediate use.



4. Life and History of Silk Worm, from Eggs to Papiion.

Let us take the case of the Frontier province; on one side it is touching
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The importance of State aid for the developement of industries has been acknowledged on all hands. In every other place, in Punjab, Madras, U P and Bengal and even in the Indian States this industry at the beginning has been encouraged by their respective Governments. By awarding prizes, propaganda (Salvation Army) and exerting every kind of influence, the State has induced the ignorant cultivating classes to rear the humble caterpillar, an astoundingly rare creation. It is an ungainly little looking insect of a remarkable organism, having twelve composed eyes (six on each side), sixteen feet or, jambs, eighteen breathing orifices, a powerful mouth and an equally powerful stomach whose work is in contradistinction to its appearance. It is one of the productions of Nature whose utility exceeds its

beauty have done wonder in this world

A little insight into the history and progress of silk industry in Kashmir and Mysore states will show what can be achieved in this direction. Both the States imported European staff and silk worms seed in the beginning but now this industry is on sound footing in both the States. Kashmir only imports a nominal quantity of eggs and a larger quantity is produced locally by its own experts the majority of which are Indians. The Mysore State has altogether stopped importing silk worm seed, and the whole industry is managed by Indian staff.

The Punjab Government is also making strenuous efforts to promote this industry although the development has not been made without employing all the resources of modern technique and has recently engaged an Indian as mulberry and sericulture Superintendent, the result of which is that the output has been doubled in a very short time.

It is absolutely necessary to keep the eggs of annual races of silk worms for hibernation; places round about Mansera, Thal, Parachinar, Cherat and Abbotabad are the best for a hibernation room. In these places the climate being favourable, a small room can be built for the purpose which will last for years. In this room the imported eggs with a quantity of quick-lime to keep the air of the room dry can be kept for three months viz November, December and January. This kind of hibernation is less costly than the artificial hibernation of keeping eggs in a room with ice.



Fig 2. A Typical Magnanery with *Morus Alba* in the back ground

After the hibernation, the time of post-hibernal comes with the beginning of the spring season; the seed which has undergone the effect of cold is now kept for incubation. The temperature required is from 66° to 75° degrees Fahrenheit covering a period of ten days when the incubation should be completed. During these ten days the temperature should be raised little by little and must not exceed 22° centigrade or 75° Fahrenheit. For a good incubation respiration of the eggs should be without hindrance. For big quantity of eggs there should be a special room called "Chamber d' incubation" or "Chamber d' eclosion" provided with a heating chimney the smoke from which should go out; sufficient ventilation and thermometer to indicate the

Required degree of heat. Variation of temperature should be altogether avoided as it affects the growth of germ in the egg, tires it out; makes it weak and less healthy to resist Flachery. (One of the worst diseases of silk worms)



Fig 3. A modern machinery for preparing mulberry leaves to detect diseases in eggs, silk worm and moth

The best time for incubation in Frontier Province is middle of February, when the mulberry trees are sprouting. Each morning the hatched worms are gathered by the help of fresh mulberry leaves kept all round the eggs. The smelling power of worms is very remarkable; as soon as it smells the food it begins to crawl and in a moment all the leaves will be attacked by the new-born vagabonds. The remaining eggs in the drawers are to be moved by the help of a feather of any bird, hen, pigeon, peacock, crow or kite.

The hatched worms with leaves are taken in another room already disinfected by sulphur, lime water or cowdung. The ordinary living houses of our Zamindars can be used by them for rearing purposes. If for example, there is scarcity of rooms in a village the rooms where they keep their cattle in winter can be used for rearing, because in March the cattle do not require to be kept indoors, as is done in Kashmere Mysore, Afganistan, Japan, and in Europe. From the birth up to the 3rd moult the food is given six times a day, viz. at 5 & 10 A.M. 1 & 4 P.M. and at 7 and 10 in the evening; after the third moult only four meals are given at 4 and 10 in the evening. The quantity of leaves required for the worms from one ounce of eggs is as follows

From the birth to			
1st moult	3	to	4 seers.
In the 2nd stage	9	to	10 "
	30	to	35 "
	100	to	150 "
	400	to	600 "

All the work in rearing silk worms from the gathering of leaf to the harvesting of the cocoons, can be accomplished by the women folk, specially Mahomedans, who do not give much help and assistance in the ordinary agricultural pursuits carried on out of doors by our Zamindars. When the mulberry trees are not near at hand, the husband or the son who is engaged on the fields or grazing animals on his return home can bring with him mulberry branches. The purdahnashin lady can feed the worms indoors and can easily earn money without going about seeking her livelihood.

Now we should consider thinning and cleaning or in other words removal of worms litter (excreta). Both these operations can be achieved by her at one and the same time by putting branches with leaves on the hungry worms, when the worms attack the leaves she can place these branches with silk worms on them to other tables or clean place and remove the litter with shreds of dried leaves from underneath. After cleaning the previous trays, a part of the worms should be brought back on these clean tables or trays, hence both the operations of cleaning and thinning are accomplished at one and the same time. The sweeping of rooms should be carried by her with utmost care, not with the broom but by a piece of cloth to avoid raising dust, because this dust rests on the leaves and is eaten up with leaves causing a dangerous disease amongst the worms called Flachery.

Like human beings the silk worms have got their enemies such as ants and rats and are subject to different diseases. The principal of these are Muscardine Pebrine, Flachery and the Grasserie. The Muscardine is caused by a minute insect called *Botrytis bassiana*, the spores of which develop in the body of the silk worm during the moulting period and kills it in a week's time. The best method to avoid this disease is to burn sulphur in the rearing rooms before commencement.

The Pebrine is taken from the word 'Pebre' or 'Poivre' a French name for black pepper. The worms attacked by this disease show black 'spots' on the outer skin. This disease being contagi-

ous and hereditary is found in eggs, worms, Chrysalide and the pepillon (moth). Professor Pasteur by his hard labours found it in 1870. The female moth is examined under the microscope after it has laid down the eggs. If found healthy the eggs should be used for the next rearing. If unhealthy the eggs should be destroyed then and there.

It is very hard to detect Flachery as its effects are seen in the last stage of worms when they are ripe and ready to spin cocoons. The worm suffering from Flachery become lazy and weak on account of heavy ejections of a semi-fluid substance of infectious smell. The body of a sick worm generally becomes very thin. Grasserie or the swelling of the body of silk worm is caused by in-



Fig. 4. Microscopical selection of eggs.

digestion, when the worms have eaten wet or fermented leaves. The colour of the silk worms then becomes yellow. Their disease not being contagious should not be dreaded.

On the 7th or 8th day after the 4th moult the worms are ripe and become transparent, then appetite diminishes, their body grows smaller on account of heavy ejections. At this stage the worm is but all silk. When they actually raise their heads and crawl up, the frames of rearing tables, the bundles of branches of some bush or plant should be put in rows in an arch-forming way. In France this operation is called *encabane*. When all the worms have constructed their cocoons these can be picked up by household women and children. It to be sold for reeling, they should be stifled by exposing them to the heat of the sun, by steam vapour or by sulphurous or ammomacal gas.

In a Province like N. W. F. where nearly 90 per cent of population form peasantry, over 70 per cent being Mohammedans, there can be no real economic progress unless agricultural occupation be supplemented by industrial pursuits. If the State employed technical experts for the various branches of silk industry such as Mulberry Inspectors, Sericulture Superintendents, reeling and weaving Supervisors and the like, then there is every reason to hope for brilliant

industrial future and huge economic structure of this State. Indeed much progress can be attained in a very short time if the State co-operates and helps by starting this industry in suitable centres and protect it in its infant stage by imposing heavy duty on imported Chinese, Japanese and Afganistan silk. Thousands of rupees can be saved which are annually spent in buying foreign silk.

These are some of the suggestions and unvarnished facts which I have vented to put before the Government and the public. Sericulture it is hoped will soon find its true place in the agricultural development of this province. It is my firm conviction that sericulture as a cottage industry can supplement the very meagre income of the poor cultivators (as it has done in Kashmere and the Punjab) who can utilise their spare hours for the development of this industry. Their women folks who are precluded from following any other agricultural pursuit due to purda system will also avail the opportunity of rearing the humble caterpillar. In my opinion the co-operation of the State in this industry is very necessary. I hope, the public at large will support the idea and will be ready to afford every help in its uplift.

--By Mr. D. N. Dutta, .

D. S. S. M., D. S. B. P.

THE ART OF PYROTECHNICS:

GENERAL PRINCIPLES.

UNDER the name of Pyrotechnics are included certain mixtures of combustible substances employed as signals, as destructive agents and for purposes of display (fireworks).

The various forms of pyrotechnics are therefore so contrived as to turn off either rapidly or slowly, and with more or less emission of gaseous matter, heat and light. These mixtures are mainly distinguished as heat producing, ignition communicators (technically termed 'fuse'), and light producing. The principle underlying the manufacture of fireworks is that neither any excess of the combustible nor of the combustion promoting and supporting agents should be employed, and that unavoidable accessory materials, such as are intended only to keep the essential ingredients in a certain required shape, the paper casings, etc., be in precisely the quantity required. The best proportions of the combustibles and combustion supporting substances can be readily ascertained by theoretical calculations.

COMMON MIXTURES.

The more commonly used firework mixtures consists mainly of saltpetre, sulphur and charcoal, either in the same proportions as those in use for gun powder, or with an excess of sulphur and charcoal. Some mixtures contain, instead of saltpetre, potassium chlorate and other salts, not always essential to the combustion but intend either to intensify the

light evolved or impart to it a distinctive colour, as in signals and Bengal lights.

Gun powder is used in fireworks when it is desired that there should be projectile force. A slower combustion of the powder is obtained partly by compressing the mixture. If, however, it is intended to produce loud reports, granulated powder is used.

SALTPETRE AND SULPHUR

What is known as saltpetre and sulphur mixture consists of 75 parts by weight of saltpetre, and 1 part by weight of sulphur and is used as the chief constituents of such firework mixture as are intended to burn off slowly and evolve a strong light.

GREY-COLOURED MIXTURE

What is known as grey coloured mixture consists of 93.46 per cent. of saltpetre, sulphur and 6.54 of floury gunpowder. The mixture is the chief constituent of other compounds intended to burn slowly emitting at the same time a brilliant light. All mixtures intended to emit light, including coloured lights, are prepared upon the same principle, that the salt which is to give colour shall be non-volatile at the temperature of combustion.

POTASSIUM CHLORATE.

Potassium chlorate is used in all mixtures in which it is desired to combine rapid ignition with combustion. For merely a mixture of 80 parts by weight of potassium chlorate and 20 parts of sulphur was added to intensify and quicken the combustion of mixtures consisting of more slowly burning salts.

A mixture of sulphur, charcoal, and potassium chlorate constitutes an active percussion powder.

HEAT-PRODUCING MIXTURES

These consist chiefly of floury gun powder and grey mixture, to which are added certain organic substances, as pitch, resin, tar, igniting readily, but consumed more slowly than any fire work. The heat generated by the combustion of fireworks is much higher than is required to ignite wood.

COLOURED FIRES

The salts employed to produce coloured flames are barium, strontium and sodium nitrates, and the ammoniacal copper sulphate. The following mixtures for coloured fires are calculated for 100 parts. Great care is required in mixing these materials and each ingredient ought to be pulverised separately.

	Green	Red	Yellow	Blue	White
Potassium chlorate	32.7	29.7	—	51.5	—
Sulphur	9.8	17.2	23.6	—	20
Charcoal	5.2	1.7	3.8	18.1	—
Barium nitrate	52.3	—	—	—	—
Strontium nitrate	—	45.7	—	—	—
Sodium nitrate	—	—	9.8	—	—
Ammoniacal copper sulphate	—	—	—	27.4	—
Saltpetre	—	—	62.8	—	60
Black antimony sulphide	—	—	5.7	—	5
Floury gun-powder	—	—	—	—	15

CASES, ETC.

The cases which contain the fire work compositions are carefully made of paper or pasteboard, or both, pasted in layers. They are usually cylindrical in shape, and the proportion of length to diameter, and the size of openings for the escape of the burning mixture, are

matters of importance. So also is the proper mechanical construction of the framework of rotary fireworks. Touch-paper with a solution of potash nitrate in alcohol, is used for capping squibs, crackers, and indeed for all kinds of fireworks; quick match of cotton-wick, which has been saturated with gun-powder, gum, and other ingredients, connects the parts of complicated designs, and port-fires, small pencil-like articles filled with saltpetre, sulphur, and gun-powder, are used to fire the touch paper cappings.

SIMPLE FIREWORKS.

The simpler kinds of fireworks include squibs, crackers, gerbs, Roman candles, stars, sparks, maroons, Bengal lights, etc. Squibs are small stout paper tubes filled with grained powder to which a little charcoal, sulphur, and steel filling are sometimes added, a sufficient quantity of bursting powder being put in to cause a light explosion at the end when fired. Crackers consists of a tube bent into folds and containing meal powder, charcoal, sulphur, saltpetre, and sometimes iron filings in varying proportions. The folds are tied by a cord; and on a cracker being fired a report is given at every turn of the tube. Serpents are tubes some of which have a choke in the middle; when fired they take a zigzag direction, and give out a hissing noise. Gerbs consist of a straight cylindrical case filled with a composition which produces a bright sparkling jet of fire somewhat in the form of a waterspout. They sometimes contain coloured stars. Roman candles have a resemblance to gerbs. In filling them stars are placed at intervals, along the tube between layers of the

composition. Stars are of different kinds, such as simple stars, tailed stars, and pointed stars. Simple stars consist of saltpetre, sulphur, and fine gun-powder made into a paste ball with gun and spirits of wine and dried. Sometimes they contain iron filings. Many compositions are, however, used for stars, their various colours alone necessitating this. Sparks or small stars are also made of different colours. Maroons are small boxes round or square, bound with a cord, and containing a composition which explodes with a loud report. Bengal lights consist of compositions varying according to colour, which are burned in small saucers for example, a red light can be produced by a mixture of chlorate of potash, nitrate of strontia, sulphur, and lampblack; and a green by chlorate of potash, nitrate of baryta, chloride of lead, sulphur and resin.

COMPLICATED FIREWORKS.

The most complicated kind of fireworks are some of the rotating wheels. These are called wheels because they have a framework of nave and spokes, round the rim of which cases of the nature of rockets are arranged. They revolve on a pin or metal spindle and the motion is produced as will be presently explained, by the recoil as the fire escapes from the cases, which are connected with each other by leaders. There are a number of different forms, but they may be classed under three kinds vertical, horizontal, and spiral wheels. In the case of the last, a rod (nave) rises vertically from the centre of the horizontal wheel forming the base and upon this rod cases are arranged so as to form

a spiral. Pin or Catherine Wheels and Pastilles consist each of a long paper case coiled round a rod in the form of a flat spiral, the case being of course, filled with a burning composition. Suns are either fixed or revolving. Fixed suns are of various designs, but a common kind has a number of cases radiating from a centre, from which jets of fire proceed outwards. By a suitable arrangement the fire is communicated at the same time to the mouths of each of the cases. Revolving Suns are somewhat similar to firewheels with spokes.

THE ROCKET.

Of ascending fireworks the Rocket is the most familiar and it has been known from an early period. It consists of two parts, viz., a long stick to guide it in its course, and a head. The latter, of strong paper and cylindrical in shape, has its lower portion formed into a hollow cone, base downwards, and round this cone is the burning composition. The object of the cavity is to effect a rapid combustion which fills it with heated gases, and these, issuing downwards through a small hole in the base, force the rocket up through the air. The upper portion of the head is separated from the lower by a perforated plug of plaster of Paris through which a fuse passes, so that when the lower portion is burned, the upper, which has a conical head, takes fire and sets off its garniture of stars, snakes, and other ornaments.

MISCELLANEOUS.

The Tourbillon ascends and rotates at the same time. Upward motion is given by the fire escaping from holes on the under side of the cylinder, and

rotatory motion by its finding vent from holes at the ends, but on opposite sides

Aquatic fireworks in which the devices which come in contact with the water require to be protected with grease or oil, consist of skimmers or water-devils, floating chinese trees, gerbs, and Roman candles, water-mines, water fire-fountains etc.

Composition of Mixture.

As stated before, the bases of most fireworks is meal powder, with varying additions of sulphur, charcoal, or saltpetre, to vary the rate of burning

When a bright white light is required, powdered aluminium, or an alloy of aluminium and magnesium is used. These are mixed with peroxides, nitrates, or chlorates to supply the oxygen necessary for the combustion of the powdered metals.

The Rocket.

The general form of these is familiar to all. A cardboard tube, affixed to a wooden stick, is ignited and shoots out gases and burning particles in a downward direction and so projects the rocket upwards. The cardboard case is filled

with a mixture of the black powder type which is rammed down so as to form a tight packing, but with a central conical space. The following are examples of the mixture used for rockets:—

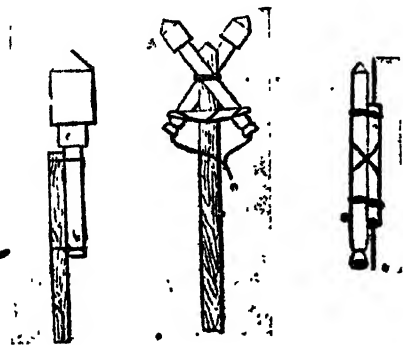
Meal powder	1	1	2	1	1
Sulphur	2	2	4	2	4
Charcoal	4	4	9	5	8
Nitre	2	1	-	-	-

In general, the mixture burns more rapidly, the more closely it approximates in composition to ordinary gun-powder. The mixing of the ingredients does not require the care which is necessary in the manufacture of gun-powder. The charcoal is coarser in the case of rocket powders, thus giving rise to a stream of sparks as the rocket rises

For display purposes, the rocket is generally required to burst at the end of its flight, and to throw out a number of coloured stars. The upper end of the cardboard case is separated from the remainder by a plug of clay, through which a piece of quick match passes. This upper portion contains gun-powder and a number of stars, the colour being produced by metallic salts.

Stars for rockets and other fireworks are made by moistening a suitable composition with a solution of gum of shellac, rolling out and drying the slab of material, which is then broken up into small sections. In other cases the dry composition is compressed into short cylinders of paper like pill boxes.

In these a straight tube of paper is filled with composition. A small pellet of clay is first inserted and rammed down and the powder mixture is then added.



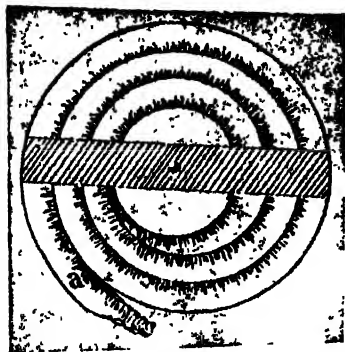
Types of Rockets

The following are samples of the mixture used:—

Sulphur	3	2	1	4
Charcoal	1	3	2	1
Nitre	4	2	4	5
Meal powder	5	8	3	4

The cases are made of selected tough paper, which is rolled round a wooden rod, and pasted to keep it in position. The rod is withdrawn and the paper tube is dried in warm air. In many fireworks the tube is constricted near one end; in other cases, a clay plug is used to keep the powder in place. The powder is filled in through a metal funnel with the help of a wire; in some cases it is loosely filled; in others it is rammed lightly.

The live end of the fireworks is almost always covered with "touch paper" which is made by soaking thin paper in potassium nitrate solution and drying when thus impregnated; the paper smoulders slowly in ignition until it reaches the powder.



Pin Wheel.

BENGAL FIREWORKS (By A Practical Expert.)

OF the indigenous fireworks perhaps the best known is Tubri or Gerb. It consists of a casing of burnt clay which is charged with a special mixture. When ignited a brilliant shower of coruscating sparks like a fountain forces out, reaches considerable height and is dazzling in its show. There are different types of Tubris named according to the nature of their displays. Some are plain, while the sparks from the others appear say like, Jasmine, Kadamba and so on. A number of recipes are given below together with some general hints on their manipulation.

The moulds of clay which serve as casing are of different sizes, but in shape they are more or less similar-looking like an inverted pitcher. The case has two openings—one wide about 1 inch and the other narrow like a pencil. The contents are charged through the former which is then plugged with mud. The latter is pasted on with paper which is ignited on firing.

A mixture of gun powder and iron filings constitutes the general charge though in particular cases novelties are obtained by substituting aluminium dust for iron filings. It yields dazzling white light.

Iron filings being one of the chief ingredient they should be chosen with proper care. There are several kinds of iron filings available in the market which determine the nature of the resulting coruscations. The following kinds are commonly employed

(a) Adruki or splints from steel balls.

(b) Kanti or cast iron utensils.

(c) Pipes and Pans.

The iron in pieces are pounded in heavy mortar and pestle and then passed through sieves. The particles are graded into different sizes such as like poppy seed, mustard seed etc. The dust portion may be rejected. The filings should be packed dry and air-tight and brought out when necessary so that they may not become rusty. In some cases the filings are obtained by working a broad file on iron.

Similarly different kinds of charcoal are obtained by burning different kinds of wood; some are light, some porous. The woods should be first dried in the sun after being felled. They must then be burnt out of contact with air. The fire should never be extinguished with water but allowed to die out naturally. The following woods yield good charcoal, viz., indigo, akanda, ahar, etc.

The other ingredients should be as fresh and pure as possible. They are to be dried thoroughly, powdered finely, weighed separately and then mixed. The mixing of the ingredients and the loading of the moulds should be carried on in the same day. To obtain best results the tubris should also be fired on the same day. In displaying they are buried in dry earth leaving the fire hole just protruding so that they might not burst.

Of the other pyrotechnics of Bengal, Rangmashal, or Bengal light has attained world renown as its name testifies. It is generally red and blue. Puljhuri (lit.

flower basket) is the progenitor of the electric sparkler which has proved so popular with children. In preparing fireworks one should be pain-staking and careful.

The ingredients employed in the manufacture of fireworks are more or less combustible and explosive. These should be handled with proper care. Want of precaution might easily lead to dangerous consequences. Hands soiled with gun-powder should on no account be applied on the mouth or eyes or in fact in any part of the face.

Phuljhuri.

(Sparkler.)

Nitre	5	tolas.
Sulphur	5½	"
Charcoal	3	"
Iron Dust	1½	"

The ingredients should be finely powdered. The iron should be in fine dust. Mix them together thoroughly. Procure paper tubes 6 inches long with apertures like a pencil. Close one end with glue and dry in the sun. Fill one-fourth with dry sand. Fill the remainder with the gun-powder forcing in the same little by little. Now close up the open end and dry thoroughly. The stiff portion filled with sand will serve as handle.

Rangmashal.

(Bengal Light.)

Nitre	16	Tolas
Sulphur	4	"
Orpiment	2	"
Indigo	4	as.
Camphor	12	"

All the ingredients should be in the form of dust and powder. Mix them thoroughly. Procure a paper tube 9 inches

long and $\frac{1}{2}$ inch diameter. Close one end and dry thoroughly. Fill about 1 inch with sand and the rest with the mixture above. Pack with a round rod and then close the mouth with flour paste.

(Another Recipe.)

Nitre	1	sr.	8	ch.
Sulphur			6	ch.
Orpiment			3	ch.
Indigo			$1\frac{1}{2}$	tola
Camphor			$4\frac{1}{2}$	"

Powder separately and mix well.

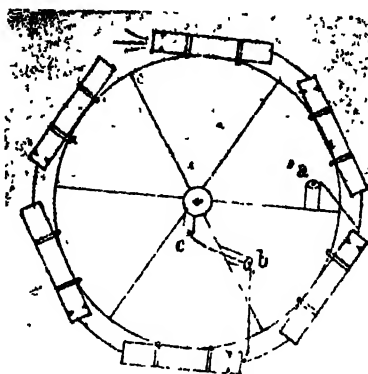
Take a paper tube, load the handle portion with sand and charge the rest with the above mixture.

Bower of Kadamba.

Split a light bamboo of the *talda* variety into several pieces. Plane them like fishing rod—the butt end thick and the tip end thin. Next produce a stout bamboo about 5 to 6 cubits long to serve as the pole. Now tie 8 or 10 pieces of the above rods on the pole leaving about 2 cubits from its bottom. The arrangement will look like the spokes of a wheel. The butt ends are to be tied while a small Rangmashal (which see) is to be fixed on the tip end of each of the rods. Three or four similar layers of Rangmashal may be fixed on the pole higher up at regular intervals. Now insert a quick match into each of the Rangmashal and connect these quick matches with one another by means of a touch paper. The touch papers of the different layers in their turn should be attached to form a main wick.

In displaying the pole is fixed into a hole in the ground and fire is applied to

the wick when a very beautiful bower of Kadamba flower (*Pandanus*) will result.



Tourbillion.

Tubri.

(1) Plain.

Nitre	1	sr.
Sulphur	1	poa.
Charcoal	1	"
Iron filing (Kanti)	1	"

Mix together and fill in 1 ch. and 2 ch. clay moulds.

To fire these are burned in earth leaving only the touch end out. A bush of sparkling stars will be displayed.

(2) Flowering Plant.

Nitre	1	sr.
Sulphur	5	ch.
Charcoal	3	"
Iron filings	5	"

The iron filing should be like poppy seed. Mix thoroughly and fill in clay moulds.

(3) Bela.

Nitre	1	sr.
Sulphur	4	ch.
Charcoal	4	

Iron filings (Aduki) 6

Fill in 2 ch. moulds.

(4) Kadamba.

Nitre	1 sr.
Sulphur	5 ch.
Charcoal	2½ "
Iron filings	7 "

Mix together and fill in moulds. The filings should be just bigger than mustard.

(5) Hazari.

Nitre	1 sr.
Sulphur	5 ch.
Charcoal	2 "
Iron filings	7 "

Max and fill.

(6) Dandi (Top-shaped).

Nitre	16 tolas.
Sulphur	5 "
Charcoal	4 "

Iron filings

(mustard size) 14 "

Mix and fill.

(7) Garland of Flowers.

Nitre	16 tolas.
Sulphur	4 "
Charcoal	12 "
Iron filings	12 "

Mix and fill.

(8) Chrysanthemum.

Nitre	1 sr.
Sulphur	1 poa.
Charcoal (Akanda)	5 tolas.
Iron filings	8 tolas.

Mix these ingredients thoroughly. The iron filings should be like mustard seed.

(9) Jasmine.

Nitre	1 sr.
Sulphur	5 tolas.
Charcoal	6 "
Iron filings (Kanti)	10 "

Mix together and fill as above.

(10) Batasa.

Nitre	4 tolas
Sulphur	1 "
Charcoal	12 as.
Iron filing	1½ tola.

Mix together and put in tiny moulds.

(11) Marigold.

Nitre	1 sr.
Sulphur	5 ch.
Charcoal	1½ ch.
Iron filings	6 ch.

Load in moulds.

(12) Spinning Top.

Nitre (fine)	1 sr.
Sulphur (fine)	5 ch.
Charcoal (akanda)	2 ch.
Iron filings (adruki)	1½ sr.

Mix and load in top-like moulds.

Flying Tubri.

Chlorate of potah	4 tolas.
Sugar	2
Chalk	1

The ingredients are powdered separately, mixed thoroughly and then charged into tiny clay moulds as and when required.

In the above formula chalk will give rosy colour. For yellow colour use salt; for green use copper sulphate; for white camphor; for red use strontium nitrate; for blue use nitrate of baryta. Sparks of fire may be obtained by incorporating a little iron dust in the above recipe.

Aluminium Tubri.

Nitre	1 sr.
Sulphur	4 ch.
Charcoal	3 as.
Aluminium	5 "

Mix together and fill in moulds.

The aluminium dust sold in the market

may be prepared by filing with a flat file a piece of aluminium held in a vice.

Jasmine Fire.

Nitre	3 tolas.
Sulphur	9 "
Charcoal	3 "
Iron filing	9 ch.

Mix together and pack in a bamboo tube.

Gold Rain.

Nitre	6 tolas
Sulphur	3 tola 6 as
Charcoal	1 tola 8 as.
Gun-powder	6 tolas
Lampblack	12 annas.

Powder separately, mix well and pack in light paper cases

Silver Rain.

Nitre	16 tolas
Sulphur	4 "
Charcoal	8 "
Spirit	1½ dr.

Powder the solid ingredients and make into a paste with the spirit. Load into a light paper case.

Coloured Matches.

The following suggestions for the preparation of the well known coloured matches will be helpful. The tips are made of ordinary safety match composition. The subsequent portions are made in a similar manner to the coloured stars of rockets. The paste is simply glued on the sticks. Being contiguous to the tips they catch fire and emit coloured lights.

Quick Match.

Take some powder in fine meal, moisten with water and lay a streak on

a thin tissue paper. Roll off like a thread. Dry in the sun. Cut into different lengths as required.

When a lengthy and flexible quick match is required take some clean white jute fibres and steep in a paste of the above powder. Dry in the sun and use where necessary such as for winding or connecting.

Gun Powder.

The Gun-powder for the above purposes may be prepared at home according to the following formulas.

(1)

	By Parts
Saltpetre	75
Sulphur	10
Charcoal	15

Powder the ingredients finely and weigh separately. Make a paste with water and lay out on a cloth thinly to dry in the sun. Finally pound the dry cakes and bottle

(2)

Saltpetre	70
Sulphur	10
Charcoal	12

Proceed as above

(3)

Saltpetre	75
Sulphur	12
Charcoal	13

Proceed as above

Weight.

sr.	4 poa.
poa	4 ch.
ch.	5 tolas.
tola	16 as.

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REMOVING STAINS FROM CLOTHS.

By working the following recipes stains of all kinds can be effectively removed from clothes which are otherwise considered damaged.

(A) Grease and Oil.

(1) For white linen or cotton goods, use soap or weak lye. For coloured calicoes, warm soap suds. (2) Dissolve 1 oz. pearlash in 1 pint water, and to this solution add a lemon cut into thin slices. Mix well and keep the mixture in a warm state for 2 days, then strain and bottle the clear liquid for use. A small quantity of this mixture poured on stains, occasioned by either grease, oil or pitch, will speedily remove them. Afterwards wash in clear water.

(3) Carbonate of magnesia—magnesia that has been previously calcined is best—is dried in an oven and mixed with sufficient benzine to form a soft friable mass. In this state it is put into a wide-mouthed glass bottle well-stoppered and kept for use. It is spread pretty thickly over the stains, and rubbed well to and fro with the tip of the finger. The small rolls of earthy matter so formed are brushed off, and more magnesia is laid on and left until the benzine has evaporated entirely. Materials that will bear washing are then cleaned with water.

(4) Castile soap in shaving, 4 oz.; carbonate of soda, 2 oz.; borax, 1 oz.; aqua ammonia, 7 oz.; alcohol, 3 oz.; sulphuric ether, 2 oz. Soft water enough to make 1 gal. Boil the soap in the water until it is dissolved, and then add the other ingredients. Although it is not apparent what good 2 oz. of ether can do in a gallon of liquid, the mixture is said to be very efficient.

(5) Make a weak solution of ammonia by mixing the ordinary "Liquor ammonia" of the druggist with one volume of cold water, and rub it well into

the greasy parts, rinsing the cloth in cold water from time to time until the grease is removed. The ammonia forms a soap with the fatty acids of the grease, which is soluble in water.

(6) Immerse the stained calico in strong soda and water, and then well wash in clean water. The soda would saponify the oil, and so render it soluble in water. If you want to carry on the cleaning process on a large scale, the best way is to boil the goods in lime water or a solution of any alkali, and then well wash them.

In the removal of grease from clothing, with benzol or turpentine the correct method is to place soft blotting paper beneath and on top of the grease spot, which is to be first thoroughly saturated with the benzol, and then well pressed. The fat is then dissolved and absorbed by the paper, and entirely removed from the clothing.

(B) Paint, Varnish and Resin.

(1) For white or coloured cotton goods apply oil of turpentine or benzine, followed by soapsuds. Chloroform is the best reagent but must be carefully used.

(2) Stains of paint or varnish, after being softened with olive oil or fresh butter, may generally be removed by the same means as ordinary grease spots.

(3) Saturate the spots with a solution of equal parts turpentine and spirits of ammonia; wash out with strong soap suds.

Tar and Axle Grease.

(1) For white cottons and linens apply soap, oil of turpentine and water in turn.

(2) For Coloured Cottons:—First smear with lard, rub with soap and water, and let it stand for a short time; then wash with oil of turpentine and water, alternately.

GOLD AND SILVER WIRE.

A QUANTITY of silver is taken which is generally very pure. The silver is melted down, poured into a mould which is about eight inches long, one inch wide and one inch deep. After being cast in this rectangular mould, the short rough ingot is taken out, heated and hammered, the edges being at first chiselled away. This process is repeated until the silver assumes the shape of a round bar about a foot or more in length and slightly more than half an inch in diameter.

To make silver wire this bar, as it is, is drawn out.

But the demand for gold, or more accurately, gilded wire is much greater than that for silver wire, as the cost of gilding is not very much and gold has such a matchless lustre.

The process of gilding the bar is comparatively simple. The weight of gold used to cover a silver bar varies, on an average, from 2 to 3 per cent of the weight of the bar. The gold must be perfectly pure, 98 to 100 touch. It is sometimes purified by being boiled in lime juice. It is heated and beaten evenly into a thin foil on a polished anvil with a flat hammer. The breadth of the foil is made exactly equal to the circumference of the silver bar while in length the foil is slightly shorter than the bar.

The surface of the silver bar is made somewhat rough by the use of a broad file. Then the gold foil is melted and neatly folded in a single layer round the silver bar. The workman then rolls the bar up and down his thigh till the adhesion of the two metals is complete. To assist this adhesion, the bar is heated slightly once or twice and cooled in a vessel of water. Gold being a more

ductile metal than silver, the latter never again shows through the gilded surface however fine the wire may be drawn out.

The bar is heated and hammered out, the ends being made slightly pointed. One end is then inserted through the largest hole in a steel plate with 20 to 30 perforations. Each hole tapers somewhat being of wider diameter on the side through which the bar is inserted. The pointed end of the bar, when it shows itself through the hole, is grasped tightly by a larger pair of pliers, the handles of which are inserted in one of the rings of a short, thick iron chain. The other ring is swipped over one of the spokes of a windlass.

As the workman guides the bar through one of the holes of the steel plate, his assistant at the other end, pushes down the spoke to which the chain is attached. At the start the effort is great. But the bar being smeared with beeswax, which acts as a lubricant and saves the surface from being scratched, slowly slips through the hole and is gradually elongated. The process is repeated and the bar steadily grows longer and longer. Each successive draw reduces the diameter of the bar and enables it to be drawn through a smaller hole in the plate. The bar has to be heated at intervals in an iron vessel containing live charcoal and hot ashes. When the wire becomes long enough the chain and pliers are dispensed with, and one end of the wire is tied to a spoke of the windlass. The process of drawing out the wire is repeated about 20 or 30 times until the wire is several scores of yards in length and not much thicker than a needle.

IDEAS FOR SMALL CAPITALISTS.

Cinema Business.

Mr. Amar Nath Gupta, Cinematographer, Thamaing, Kamayut, Burma, sends the following:—

I read the unemployment scheme in your paper with much interest and appreciation and beg to submit an idea for the unemployed.

Cinema is one of the greatest industries of the world but in India it is in a very backward position and offers a great scope for both the small capitalist and the big financier.

Any young man who can afford to lay out a capital of about 500/- rupees can buy a set as follows and earn a decent income.

Camera (small suitable for Topical and Advt films) about	400	0	0
Darkroom Tanks etc.	100	0	0
Total	Rs	500	0 0

Instructions to work the camera will be supplied by any firm from whom the camera is bought and it is not very difficult to learn sufficiently to do ordinary film taking work. Film, both negative and positive, will cost about -14/- per foot and the worker may easily secure orders for making advertisement films at Rs 2/- per foot. Besides he may be on the look-out for important events and take their films which fetch very high prices. My estimate is that even if 2 orders a month be secured of a 100 feet film, about Rs. 300/- p. m. nett can be earned.

It is not a pen and paper scheme but I am actually engaged in this line, though instead of doing much advertisement work I take up work in various film companies as Cinematographer. I started work as stated above with an ordinary camera but now possess one of the finest makes besides having travelled

all over the East on expenses out of this business.

Any one who wants to do this work and wants any other information may send his addressed and stamped envelope and I will give any advice or help he asks totally free. Besides doing this advertisement and topical film works as the worker progresses many other chances are open before him such as coming in touch with a financier who may invest about 10,000/- and start a regular film producing concern.

Please note that generally people think this business requires lacs and lacs but it is a wrong idea. Of course in foreign countries they spend crores but the case in India is quite different. There are no such large firms here to compete with. I know of many firms who started this with a capital of Rs 6/7000 and are now in a most prosperous condition in Burma. I know many firms in India fail in this business but the sole secret of their failure is that they think too much of themselves and do not take help of real artistes. Besides I know of many firms who failed only because their partners quarrelled either for taking their own stories or the leading parts.

At present an ordinarily good Cinema producing outfit costs only about 4000/- and 6000/- is sufficient to make one small 7/8 parts picture, which if ordinarily good brings at least double the amount.

Mr. K. C. Joshi, B. Sc., Govt. Technological Institute, Cawnpore, sends us the following.

Canal Contractor.

Mr. G. S. Bedi, I.D.F., Contractor, Sarda Canal, sends us the following:—

A gentleman with a small capital may take a contract in the new canals in U. P. or Bombay.

I am a contractor in the Sarda Canal, XII Sarda Divn., Hardoi Branch. The present day tendency is to give small

contracts to small firms. A man could make a decent way through with about Rs. 300/- in his pockets. The works at Hardoi are nearly finished but at Lucknow and Unao they have just commenced.

The usual rates accepted by canal authorities for 1000 c.ft. are Rs. 5|12/- and it costs about -7/- to get a Khanti dug. The Khanti measures 12'×12'×1'. This comes to about 3|2/- per thousand ft. Every contractor has to keep a local mate for collecting labour who has to be paid for Rs. 12 to 20 per month. Implements are partly supplied by Government. Baskets have to be bought at 9/- per hundred and making an allowance of 30/- for one's own private expenses a saving of |12/- for every thousand can easily be effected. Work could be measured and running payments received almost every week.

To obtain work one must at once see the Executive Engineer, XIII Sarda Div Lucknow and the E. E. XIV, Sarda Divn, Unao, Office at Lucknow. Once on the right line one could extend his business to any dimensions.

CAUTION

One must keep his money in his own hands and must attend work regularly. The ambition should be to collect as many hands as possible and the sooner the work is finished the more of a profit one is sure to get. At least in this contract there is no chance of loss unless the work is protracted indefinitely.

Vinegar Making.

An anonymous reader sends the following:—

Take 4 gallons of pure water in an earthen pitcher or in an enamelled vessel. Put in the above vessel (containing water) 3 gills of molasses; stir and dissolve it well. Then put in the above 12 ozs. acid acetic fort. (Country) and mix the whole well. Cover the mouth of the vessel and let it remain for 24 hours. After that stir in the whole well through muslin or any other cloth. Then bottle them in ordinary pint bottles

Estimated cost of 2 dozen bottles.

4 gallons of water	
3 gills of molasses	- 2
12 ozs acid acetic fort C.	-6
Empty bottles 20 oz.	18
Labelling and packing, etc.	- 6

Total Rs. 2|6/-.

If this quantity be sold for a nominal charge of Re. 1|14/- a dozen the price of 2 dozen comes to Rs. 3|12/-. Therefore profit Rs. 1|6/- But this can be sold at a still higher rate say for Rs. 2|4/- a dozen.

A very small capital is needed, one can start it with Rs. 8/- at a good term. Well coloured and designed, labels at least 250 can be printed for Rs. 3|8/- or less while the balance is quite sufficient to prepare 4 dozen of vinegar.

Vanishing Colours.

Mr K. C. Joshi, B. Sc., Govt. Technological Institute, Cawnpore sends us the following:—

The process which I am going to describe below is for making "Vanishing colour." This vanishing colour will sell like hot cake, during the Holi Festival. Even now it will be much liked by people for both amusement and amazement it provides. The article when thrown on the clothes gives a deep pinkish coloration but to the utter amazement the colour fades away leaving its place quite blank as before.

Take a solution of ammonia which can be easily got in the market; add to it some Phenolphthalein solution. If the solution is not available take solid Phenolphthalein and make the solution thus. Dissolve 5 gms. of solid phenolphthalein in 100 c.c. of warm methylated spirit and dilute to 1 litre with a mixture of equal volumes of methylated spirit and water. If required in large quantity the volume may be increased proportionally. But the above will be more than sufficient. The deep pink colour should be bottled and corked and sold—3 as. each—well labelled with the qualities described. A decent additional income can be had by following the process.

HINTS AND SUGGESTIONS.

Transferring Fluid.

Dissolve a piece of common yellow laundry soap, about the size of a big nut, in a pint of hot water. When the solution is nearly cold add one-fourth of spirits of turpentine and shake the mixture until well mixed. Apply this liquid to the surface of the picture which you wish to transfer, using a soft brush and being careful not to smear the ink which soon becomes softened. Allow the picture to soak for a few minutes and then dampen with water the plain paper on which the transfer is to be made. Place it upon the picture and press it down firmly, for about one minute. On separating the two pieces of paper a reversed transfer will be found on the plain paper.

Label or Envelope Gum.

This gum is similar to that used on postage stamps and should be brushed over the part of the paper to be gummed. Dissolve a teaspoonful of gum arabic in 8 spoonfuls of water. It may be necessary to warm this mixture to hasten solution. Add 4 teaspoonfuls of sugar and then one teaspoonful of starch and boil this mixture for a few moments. If the gum is too thick add a little water. In case you want to keep the gum in liquid form a preservative must be added to keep it from moulding. One half teaspoonful of boric acid thoroughly mixed with the gum will keep it free from mould.

Violet Ink Fluid.

To make violet ink dissolve one-fourth teaspoonful gum arabic in 2 oz. of water when completely dissolved add one fourth teaspoonful of methyl violet and drop one or two of carbolic acid to keep it from moulding.

Blue ink is made in the same way except that aniline blue should be used instead of methyl violet.

To Colour Electric Light Bulbs.

Beat the white of an egg to a froth and then mix it with 4 oz. of water.

Filter this solution through a cloth and be sure that no bubbles remain on the surface. Mix together in a vessel of proper size and shape in which to dip the bulbs. Pour first the solution and add equal parts of amylacetate and denatured alcohol. Dissolve in this solution dye of the desired colour. Clean and polish the light bulbs to be coloured and then dip them into the mixture just prepared. Hang up on the string to dry.

For red colour use Fuschine red.

For blue colour use Aniline blue.

For yellow colour use Naphthol yellow.

For violet colour use Methyl violet.

Sparkler.

Sulphur	2 parts
Zinc (powdered)	2
Magnesium (Metal)	2
Strontium Nitrate	2
Potassium Nitrate	3

Mix thoroughly on a sheet of paper. Then moisten steel wire with gum arabic solution and rub this wire in the above mixture. The mixture will attach on the sides of the wire. After the wire is dry light it and it will burn brilliantly with various coloured lights. This burning looks very pretty in a dark room.

—BY MR P. A. GHARAT.

Breaking Glass.

Dip a piece of thread into turpentine. Wrap it round the glass in the direction in which you require it to be broken and then set fire to the thread; or apply a piece of thick red hot copper wire round the glass and if it does not crack as required at once, throw cold water on it whilst the wire remains hot. By the above means glass that is broken irregularly may often be re-fashioned and again rendered useful for chemical and other purposes.

A Magical Picture.

On a wooden frame stretch lightly a piece of unbleached muslin; make separate solutions of the four following chemicals in warm water.

(1) Sulphate of iron, (2) Nitrate of bismuth, (3) Sulphate of copper, (4) Prussiate of Potash.

Use the first three for your "invisible" picture, the fourth is sprayed on—it is the developer. Use a separate brush for each colour, avoid much detail, allow one colour to dry thoroughly before applying the next. When dry all are invisible; when sprayed on with the prussiate of potash, the sulphate of iron comes up blue, the nitrate of bismuth yellow and the sulphate of copper brown.

The Invisible Made Visible.

Take any ordinary photographic negative—and take a print from it on chloride of silver paper (not self-toning) and without toning fix the print in a ten per cent solution of hypo. Wash thoroughly. Next float the print on a five per cent. solution of chloride of mercury. The picture will rapidly fade away and disappear. Again thoroughly wash the print and allow to dry. The image can be made to reappear by immersing the print either in a five per cent solution of hypo or a weak solution of ammonia.

—CONTRIBUTED.

Bleaching Oils.

Linseed oil, and other vegetable oils, used for making varnish, etc., can be bleached by exposure in thin strata to the sun's rays, in wide and flat pans filled with a solution of common salt, on which they float. The salt water absorbs mucilage, purifies the oil, and prevents it from subsequently getting rancid. It takes from two days to a week to bleach the oil, according to its quality and the strength of the rays of the sun.

Preservation of Potatoes.

Potatoes plunged into boiling saturated solution of salt for only 10 seconds can be kept for any length of time. This process prevents potatoes rotting and sprouting.

This process can be adopted in the household and also in storing for the monsoon.

—BY MR. M. N. NARVEKAR.

A Simple Remedy.

A tried remedy for Itches, Eczema, Boils, Ulcers and all sorts of blood impurities.

PREPARATIONS:—One Poa ($\frac{1}{4}$ of a seer) by weight of Neem-bark (Azadirachta-Indica) together with one seer of pure water to be boiled in an earthen pot and evaporated till only $\frac{1}{4}$ of a Poa (One Chhatak) remains. After filtering the decoction a red hot iron rod should be dipped in it.

DIRECTION:—To be taken once a day in the early morning in empty stomach.

DOSE:—From $\frac{1}{2}$ to 1 Chhatak according to age. This will astonishingly remove the above complaints together with blood impurities if used for at least a week.

—BY MRS. ANNAPURNA DEVI.

Khushbudar Suparain.

(Perfumed betel nut chips for masticatory.)

Supari Powdered (Betel nut)	5 Tolas.
Katha (Catechu)	$\frac{1}{2}$ "
Lavang (Cloves)	$\frac{1}{2}$ "
Joyphal (Nutmeg)	1 "
Elaychi (Cardamom-minor)	1 "
Taj (Cinnamon)	1 Masa.
Kabab chini (Cubea Officinalis)	$\frac{1}{2}$ Tola.
Joy-patri (Mace)	$\frac{1}{2}$ "
Kesar (Saffron)	1 Masa.
Kasturi (Musk)	1 Masa.

Powder and mix well. If rose arabic is mixed carefully to taste with a little peppermint and placed in tinpots, it makes a good and medicated preparation for Pan or Tambool and can be sold. Mix accurately. Label nicely.

8 masa.=1 tola.

—BY S. LAXMON ART AGENCY.

MAGICAL NOVELTIES.

DISSOLVE some camphor in hot spirit. When the solution is perfectly clear, put it in a cool tumbler. The camphor will soon crystallise into a nice tree-shape.

Mix ether and half dram ammonia in a glass tumbler. If you throw into it a red flower it will become blue, while a white flower will become pink.

Take the kernel out of a walnut. Put into the empty shell a mixture of powdered sulphur, salt petre and mercury. Insert it inside a bread and place the same in an oven. The bread will begin to dance when it becomes hot.

Take some hydrochloric acid in a tumbler and dilute with water. Drop an egg on the liquid. It will first sink, but will immediately float up and subsequently rise and fall.

Bore two tiny holes at the two ends of an egg and load the shell with a mixture of lime and sulphur. Now stop the holes with wax and throw into a river. It will explode with a loud report.

If a duck's egg be soaked in vinegar for some hours it will become so soft that it can be easily passed down the narrow neck of a bottle.

Make a tiny hole in an egg and throw out the contents. Fill the empty shell with sulphuric acid and stop the hole with wax. The egg will move about in a few minutes.

If a few dry grains of silver nitrate be thrown on a piece of burning charcoal, a very dazzling silvery white light will be emitted.

Roll a linen rag which has been well soaked in salt, or preferably covered with it round a candle; light the candle, and

it will burn even if placed in the open in a strong wind.

An alloy, which may be kept in a state of fusion by placing it upon a piece of paper and holding it over a candle, may be made by melting together equal parts of bismuth, lead and zinc.

Spin a hard boiled egg on a small wooden tray, and gently move the tray on a small circle in the opposite direction to that in which the egg is spinning. The egg will revolve for an indefinite period.

Take a large tumblerful of water throw into it 10 gr. phosphorus. Then place the bottle on a water bath. When the water in the bottle becomes warm balls of fire will become visible. They will roll about.

Take a large tumblerful of water and put into it 15 gr. finely powdered zinc and 6 gr. phosphorus. In another tumbler take dilute sulphuric acid with water. Make the room dark and then pour the diluted acid gradually into the mixture of zinc and phosphorus. Immediately there will appear a fountain of fire.

Soak a piece of thread in a saturated solution of salt and thoroughly dry it. Hang a ring from it and burn the thread. The ring will continue to hang contrary to expectation.

Make a hollow ring of brass; fill it with mercury and close the pore. Heat the ring and leave it on a plain floor. It will begin to dance of itself. The ring will indulge in this frolic so long as the mercury is hot. When cool it may be heated again.

Small Trades & Recipes.

Peppermint Lozenges.

Make a syrup of 1 pound of fine white sugar with $\frac{1}{4}$ pint of peppermint water; stir into it while hot $1\frac{1}{4}$ ounce of finely powdered peppermint, $\frac{1}{4}$ ounce of lozenge spice, 1 ounce of peeled sweet almonds cut in thin pieces, and 1 fluid drachm of oil of peppermint, and form the mass into lozenges.

Spice for Lozenges.

Commute to a coarse powder $1\frac{1}{2}$ ounce of cinnamon, $1\frac{3}{4}$ ounces of ginger root, $1\frac{3}{4}$ ounces of cloves and $\frac{1}{4}$ ounce each of mace and nutmeg, and sift the fine powder out. Keep this spice in well closed bottles. It is employed in many lozenges.

Artificial Fruit Essences.

Apple—Aldehyde, 2 parts; chloroform, acetic ether, nitrous ether, and oxalic acid, each 1; glycerine 4, amyl valerianic ether, 10.

Banana—Consists usually of butyric ether and amyl-acetic ether, equal parts, dissolved in about 5 parts alcohol.

Blackberry—Tincture of orris root (1 to 8), 1 pint; acetic ether, 30 drops; butyric ether, 60 drops.

Grape—Oenanthic ether, glycerine, each 10; tartaric acid, 5; succinic acid, 3; aldehyde, chloroform, and formic ether each 2, and methyl-salicylic ether.

Lemon—Oil of lemon, acetic ether, and tartaric acid, each 10; glycerine, 5; aldehyde, 2; chloroform, nitrous ether, and succinic ether, each 1.

Orange—Oil of orange and glycerine, each 10; aldehyde and chloroform, each 2; acetic ether, 5; benzoic ether, formic ether, butyric ether, amyl-acetic ether, methyl-salicylic ether, and tartaric acid, each 1.

Pineapple—Amyl butyric ether, 10; butyric ether, 5; glycerine 3; aldehyde and chloroform, each 1

The above formulas are given in parts by measure for 100 parts alcohol, and whenever acids are used, they are to be previously dissolved in alcohol.

Candy Orange Drops.

It is comparatively easy to make a hard candy, but to put the material into "drop" form apparently requires experience and a machine. To make the candy itself, put, say, a pint of water into a suitable pan or kettle, heat to boiling and add gradually to it 2 pounds or more of sugar, stirring well so as to avoid the risk of burning the sugar. Continue boiling the syrup so formed until a little of it poured on a cold slab forms a mass of the required hardness. If the candy is to be of orange flavour, a little fresh oil of orange is added just before the mass is ready to set and the taste is improved according to the general view at least by adding, also, say 2 drachms of citric acid dissolved in a very little water. As a colouring an infusion of safflower or tincture of turmeric is used.

INDIA'S INDUSTRIAL PROGRESS.

Electrical Power in Demand.

The demand for cheap electrical power is increasing all over India, and the Public Works Department of the Madras Presidency has in hand three hydro-electric schemes namely, the Pykara, Pinjaikave and Papanasan projects. Detailed investigation of the markets for these schemes shows that in each instance the figures obtained are already above the demands originally anticipated. The Mandi project, which is in progress in the Punjab, also assures a generous supply of current in large areas in that province. A number of towns in the United Provinces are to be supplied with current

Motor Tractors for India.

During the last five years motor tractors have been tried in different parts of India. The general opinion, as recorded by the Agricultural Adviser to the Government is that they are useful for two purposes, namely (1) for light and shallow cultivation on large estates, when a considerable area of land has to be cultivated in the shortest possible time and (2) for clearing lands infested with persistent weeds. They are being used too, for stationary work, but when employed for such work are less economical than an oil engine.

The types of tractors tested up to date are not sufficiently powerful for ploughing where the soil is very heavy and weedy. They are not sufficiently fool-proof either; it is very difficult to keep them in running order, as first-class mechanics are not easily obtainable and spare parts are not always available in the country. Still, the fact remains that, with intelligent use, the tractor is a farm-power unit of considerable possi-

bilities in tracts where the draught power available is inadequate, and where in the absence of any other form of mechanical power, it is impossible for the agriculturist to perform his tilling operations under the best condition.

Match Industry in Bengal.

We learn from the Government Report that a number of large and up-to-date match factories have been established in and near Calcutta, 8 in all. The approximate output of these factories will be near about 13,000 gross boxes of matches per diem. The smaller match factories using hand machines have either ceased to exist or are in a moribund condition. It appears that the cottage system for the manufacture of matches will not be able to hold its own and face competition with the modern factories using up-to-date power-driven machinery. As many operations are involved in the production of finished matches and as the products are of comparatively small value, it is unlikely that the manufacture of matches on the cottage system will be successful.

Technical Education in Burma.

Among the institutions imparting technical education in Burma, the Government Technical Institute, Insein, is the most prominent. The institute is passing through a phase of rapid expansion and the increased support, financial and other, granted by the local Government, the additional aid given by employers, the strengthening of the staff and the improvement of the building and equipment have all contributed to the awakening of the interest of the people of the Province in the institution, which promises to assume its rightful place in providing Burma with trained engineers.

SCIENTIFIC AND TECHNICAL TOPICS

The Diagnosis of Cancer.

An important advance in cancer diagnosis has been made by a German scientist. It is claimed that by means of a cleverly devised apparatus he could examine a few drops of a patient's blood and detect cancer in its early stages in any organ of the body. In addition he could, by examining a patient's blood six months after an operation, tell whether the operation had been successful in removing all traces of cancer from the affected parts. This is a very important advance in medical science. Instruments have been devised for measuring blood reactions spectroscopically. Ordinarily blood examined in this way gave certain bands of colour and the scientist had discovered that in a precancerous condition the blood gave quite different reactions.

Mosquito Control.

In a technical contemporary, Paris green is referred to as a larvicide that is cheap and potent, and acts effectively on the surface-feeding anopheline larvae in areas of water covered by aquatic vegetation and algae. The Paris green is used diluted, and road dust is the cheapest and best diluent. The dust is screened and stored under cover in large quantities, since only a very dry dust can be used. Failing road dust, wood ashes, spoiled flour, lime, fine sand, and cork dust may be substituted. The mixing has to be done thoroughly, and the application can be done by hand, throwing the mixture in the air in such a way that the wind will carry the dust over the surface of the water. A hand blower or

bellows of the type employed by farmers to dust vines may be used. The blower gives a good cloud and an even spread. The strength of the mixture in Paris green, which should contain 50 per cent, of arsenious oxide is 1 per cent. When the water is covered with scum considerably larger amounts are necessary. The person distributing the dust takes care to keep to windward of the dust cloud. It is stated that Paris green in quantities destructive to anopheline larvae does not kill culicine larvae except in very shallow pools, and these, if present may be used as a rough index of safety. It does not harm fish of any kind.

Medicinal Properties of the Apple.

There is one article upon the beneficial properties of which all authorities appear to agree--namely, the apple. Though such a common fruit, many are not fully aware of the apple's valuable medicinal properties.

It is claimed on its behalf that the apple is an excellent brain-food, owing to the amount of phosphoric acid it contains in an easily digestible form; that it excites the action of the liver, promotes sound and healthy sleep, and thoroughly disinfects the mouth, assists the kidney secretion, prevents the formation of stone, obviates indigestion, and is one of the best preventives of diseases of the throat; and last, but not least, it is said, next to the lemon or the orange, to be the best antidote for the thirst and craving of those addicted to the alcohol and opium habits.

Private Wireless Telephones.

A young Austrian engineer claims to have invented a wireless telephone apparatus whereby secrecy of transmission and reception can be obtained. The principle of this invention is described as somewhat similar to that of the combination lock of a safe. The apparatus emits successive waves of three different lengths, which change every sixty thousandth of a second, and thus the receiving apparatus must not only be tuned to receive this combination but must be synchronised, so that the wave-lengths exactly correspond.

The inventor suggests that subscribers to the proposed new telephone system should have call-numbers, and that after calling up a number in the same manner as that employed for automatic telephones, the two sets should be tuned to the special combination. It is also claimed that not only would the conversation remain private but that, thanks to the changing wave-lengths, other communications would not be interfered with.

Heart-Beats by Post.

A noted medical scientist has made it possible for doctors to record patients' heart-beats on gramophone records, so that they can be sent by post to specialists for diagnosis.

The instrument that enables this to be done is an extra-sensitive stethoscope called the Stethophone, which amplifies the sound made by a heart beating, and at the same time causes the sound to be

recorded on special records; in addition to this, the doctor's comments on the case are also recorded.

One of the difficulties of diagnosing heart and lung troubles by the stethoscope has been that the instrument does not clearly distinguish the "murmurs" of one organ from the other. The Stethophone renders this practicable; moreover it enables any number of doctors to listen to the same heart beating.

In the near future it will be possible for a patient to lie in bed in his own home and have his case diagnosed by specialists hundreds of miles away.

Why Egg Yolk is Yellow.

The colour of the yolk of an egg reflects the composition of the food eaten by the hen, and is derived directly from that of the food. Such pigments in the food as are readily soluble in fat—the oil colours so to speak appear in the yolk. In the usual diet of hens the most prominent of these is carotin, the colouring matter of carrots. The yolks of eggs, therefore are yellow, but it is possible by putting red or orange pigments into the food to produce eggs with yolks of a corresponding colour. The colour is laid on in layers with the day's growth of yolk. In reality the yolk is in layers, alternate yellow and white, like the coats of an onion. If, therefore, one could make out the layers, one could tell how many days it had taken the yolk to grow, just as by counting the rings on the cut surface of a tree trunk the age of the tree, as measured in years, could be ascertained.

FORMULAS, PROCESSES & ANSWERS.

Preparation of Dutch Gold.

8986. R. S. W. Meerut City — Writes, "what is Dutch gold and how is it prepared?"

Dutch gold is composed of copper, 77.75 to 84 per cent. and zinc 15.5 to 22.25 per cent. The alloy is pale to dark yellow according to the proportions of copper and zinc used. Being very ductile, it is employed in the manufacture of Dutch leaf.

The alloy is melted in graphite crucibles and cast in iron moulds to semicircular bars about 24 inches long and $\frac{1}{2}$ or $\frac{3}{4}$ inch wide. The bars are then rolled cold, and each resulting ribbon is made into a pile about 2 feet long and beaten under the hammer to a ribbon about $1\frac{1}{2}$ inches wide. It is then annealed and beaten into a ribbon 2 $\frac{1}{2}$ inches wide, and, after further annealing, into one 3 $\frac{1}{2}$ to 4 inches wide. This last ribbon is pickled in dilute sulphuric acid, washed, boiled bright in argol (potassium bitartrate) solution, washed, brushed, and quickly dried. The ribbons are then cut up, and 1000 to 2000 pieces are made into a pile and beaten under the hammer. The material is then again cut up, the leaves are placed between gold beater's parchment and reduced by beating to about 5 $\frac{1}{2}$ inches square. Each leaf is then cut up into 4 pieces, which are placed between skin and beaten by hand to about four times the size of the original leaf. The

hammer used weighs 5 $\frac{1}{2}$ to 11 lb. and the work is performed upon an anvil of dolomite (magnesium limestone) by alternately beating with the right and left hand turning the package with the free hand. The package is made up of from 800 to 1000 gold beater's skins, between which the metal leaves are placed; on top and bottom come six parchment leaves, and the whole is then tied up in parchment. After the heavy hammer has been used for about an hour beating is continued for about 2 hours with a hammer weighing from 12 to 16 $\frac{1}{2}$ lb. To prevent the leaves from adhering to the skins owing to the development, of heat they are coated with gypsum (sulphate of lime). The leaves, when taken from the skins, are trimmed and placed in small books between tissue paper rubbed with rouge. Each book contains from 21 to 25 leaves.

Uses of Coconut Husks.

193. M. Q. R. S. Madras. Desires to be enlightened on the uses of coconut husk.

Husk is utilised in making coir-fibre for ropes, twines, matting, carpets, brush and broom fibre, caulking, and always fuel. Husks are exceeding rich in potash and phosphoric acid, so their value as manure is considerable although where possible to turn them into fibre the value of the husks is wasted if used as manure. It may serve as fuel for smoking fish.

Although opinions are against the possibility of utilizing coconut fibre as a raw material for paper making, it is worth considering from the standpoint of its adaptability for making some classes of paper or paper pulp. The fibre may some day prove the nucleus of vast card-board or coarse paper making work of considerable value.

Shellac Wax.

349. P. C. B. Calcutta.—Enquires how shellac wax is obtained.

This wax is obtained in India by heating stick lac with water, cooling and collecting the wax which solidifies on the surface. By this method large quantities of the wax can easily be obtained, but it is possible that wax with higher melting point may remain in the stick lac. The following methods of obtaining the wax may, therefore, be adopted to ensure the whole of it being separated. Indian stick lac is carefully separated from fragments of the twigs and bark, ground to a fine powder, and completely exhausted with water; this treatment removes sugar, proteid substances, soluble salts, colouring matter, etc.; the residue is then percolated with cold alcohol until no more resin is extracted and dried; the dried powder is next extracted with hot xylol and the solution allowed to coagulate when the crude wax separates as a yellow mass.

Bleaching Cotton Yarns.

1537. T. B. B. S. Sibapur.—Writes "Kindly give some hints on bleaching yarns."

Before proceeding to bleach cotton yarn, the hanks have to be laced; they are then made into chains of about 120 lbs. either by tying them together end to end or by linking them together. The boiling may be conducted in either high or low pressure kiers. During boiling, the yarn should be covered in order to prevent it from coming into contact with the air. When the boiling has been completed, the yarn is usually washed in the kier once or twice, first with hot and then with cold water. The yarn is now placed into cisterns, preferably made of *aspes qum papaxad '(ajus) auas* bottoms, in which it is treated with the bleaching solution, washed and soured. The average quantities required for 100 lbs. of yarn are given in the following recipe:—

BOILING—5 to 10 hours, 3 to 5 lbs. of soda ash, or $2\frac{1}{2}$ to $3\frac{1}{2}$ lbs. of caustic soda.

WASHING—Wash in the kier, first with hot water, then with cold water.

BLEACHING—Chemick in the cistern with bleaching powder solution, $1\frac{1}{2}$ to 2 Tw., 2 to 3 hours.

WASHING—Wash in the cistern for about 1 hour.

SOURING—Sour for 1 to 2 hours in the cistern with either sulphuric or hydrochloric acid at 1 to 2 Tw.

WASHING—Wash the yarn in the cistern and then in the machine. The yarn should be finally passed through a weak solution of soda and soap.

Lime Burning.

1443. G. C. S. Meduk.—Requests us to describe a simple process of lime burning.

Lime-making is a very simple industry, the only distinctive operation requiring attention being the burning of the limestone. In burning limestone to lime, heat is required for three purposes:—

(a) Evaporating any water contained in the limestone.

(b) Heating the limestone to its dissociation temperature.

(c) Driving off carbon dioxide from the lime (and magnesium) carbonate. There are various types of kilns employed in lime-burning, which are more or less complicated. A simple kiln for lime burning may however be made of stone and located in such a position that the top is easily accessible for charging the kiln with stone and the bottom for supplying fuel and drawing out the lime. In charging, the largest pieces of limestone are first selected and formed into a rough stone-like arch with large open joints springing from the bottom of the kiln to a height of five or six feet. Above this arch the kiln is filled from the top with fragments of limestone, the larger pieces being used in the lower layers, these being topped off with fragments of smaller size.

A wood fire is then started under the dome, the heat being raised gradually to the required degree in order to prevent the sudden expansion and consequent ruptures of the stones forming the dome. Should this happen, a downfall of the entire overlying mass would take place, putting out the fire and causing the total loss of the contents of the kiln. After a bright heat is once reached throughout the mass of stone, it is main-

tained for three or four days to the end of the burning. This is indicated by a large shrinkage in volume of the contents of the kiln, the choking up of the spaces, between the fragments and the ease with which an iron rod could be forced down from the top. The fire is then allowed to die out and the lime is gradually removed from the bottom. This process of burning is simple and cheap, the only expense being for blasting the stone and preparing the fuel.

Finishing Aluminium Articles.

1367. F. C. Delhi.—Requests us to describe the various processes of finishing aluminium articles.

A fine frosted surface, in aluminium can be obtained by dipping the metal into a solution of caustic soda, washing thoroughly and then dipping in dilute sulphuric acid, and again thoroughly washing.

POLISHING ALUMINIUM.

Aluminium will take and retain a very high polish and is treated in much the same way as brass and German silver. The articles are first sanded with ordinary sand and oil on a bob covered with leather, running at high speed. The next operation is grease mopping, using tripoli compo and a calico mop, and finally the articles are finished off with a soft mop, using dry lime.

SATIN FINISHING.

A fine steel scratch brush running at high speed will give a very white satin finish to sheet metal. Light strokes are desirable, and the brush must be quite free from grease. Sheffield lime applied to the brush will remove any occasional

splash of oil or grease from the machine. Sand castings may be polished by this method, and all sand, and discolorations caused by overheated metal effectually removed.

SILVERING.

The objects to be silvered are heated to about 300°C and rubbed with a bit of wadding covered with tin chloride; in this way we obtain a permanent coating of tin, upon which the silver is evenly deposited. The bath is made thus:—

30 parts silver, 60 parts cyanide of potassium, 1,000 parts distilled water.

Enamels for Jewellery.

1718. A. D., Bilimora.—Writes "Please describe a process for enamelling on gold and silver."

Enamelling executed on gold and silver (or copper) is known as art enamelling. It may be divided into four groups:—(1) *Bloisone*, in which small divisions or cells made of fine wire are soldered on a metal basis (usually copper), these cells being afterwards filled with powdered enamels which are fused into position;

(2) *Champlevé* in which the design is hollowed out of a metallic surface, the hollows being filled as in *cloisonné*;

(3) *Limoge*, in which the enamels are melted direct on the base without the use of cells or hollows;

(4) *Painted enamels*, in which the enamel is dropped on the base in a semi-molten state, in a manner similar to that used in sealing a letter with wax.

The composition of these different enamels varies greatly, but they are chiefly mixtures of flint, red lead, and

nitre, with sufficient borax to give the requisite fusibility, and at the same time prevent excessive crazing or cracking. A much used recipe for *Champlevé* enamel consists of flint 6 parts; borax 2 parts; nitre, 12 parts; red lead 12 parts. For silver enamelling some modification of the following recipe is extensively employed. White lead, 44 parts; nitre, 34 parts; flints, 30 parts. Some enamellers of gold and silver start with borax, and modify this by the addition of flint, so as to prevent crazing, but the more complex mixtures just mentioned are preferable and more durable and correspond closely with the enamels sold ready for use.

Preparation of Vanillin.

1539. S. S. T., Fatehgarh.—Asks how artificial vanillin is prepared.

The most important method by which vanillin is now prepared is by the oxidation of eugenol the chief constituent of oil of cloves. This process is the subject matter of English and American patents. The eugenol was instructed to be separated by diluting the oil with three times its volume of ether and agitating the ethereal solution with a dilute solution of potash or soda. The aqueous liquid is separated and acidified and the resulting acetoeugenol is dissolved in acetic acid and oxidised with potassium. The liquid is then filtered, and rendered alkaline, and the whole is then evaporated, and the residue treated with moderately dilute acid, and extracted with a solution of sodium bisulphide, which combines with the vanillin. The double sulphite compound is decomposed

with dilute sulphuric acid and the vanillin is extracted with ether, from which solvent it is obtained in fine white crystals.

Enamel Paints.

1557. V. G. S., Bombay.—Writes, kindly throw some hints on the manufacture of enamel paints.

Enamel paints were at first produced by dissolving white damar gum in turpentine and using this liquid as the vehicle in which to grind the pigment base, which was generally composed of French process zinc oxide used in sufficient quantity to give an enamel of good body. When applied to a surface such enamels would dry rapidly to a high gloss. Higher grade enamels were made of French process zinc oxide ground in short oil varnishes of the copal type. More recently, however, lithophone has been used in place of zinc oxide for the production of certain types composed of French process. Zinc oxide used in sufficient quantity to give an enamel of good body. When applied to a surface such enamels would dry rapidly to a high gloss. Higher grade enamels were made of French process zinc oxide ground in short oil varnishes of the copal type. More recently, however, lithophone has been used in place of zinc oxide for the production of certain types of enamels. Bodied oils are also finding a wide application as a vehicle for such products. Linseed oil, blown and bodied to a very heavy consistency, forms an excellent, enamel vehicle especially when mixed with a light hard resin varnish. Enamel paints

produced through the use of such oils are more durable for exterior purposes than those produced from straight spirit or gum varnishes. In the manufacture of some enamels the pigment base is often milled in a very small amount of bleached linseed oil, in order to condense it as much as possible, the paste being reduced with boiled oil and run through roller mills, subsequently to be thinned with a light turpentine oleo resinous varnish.

Utilising Rubber Waste.

1552. S. C. S., Beawar.—Requires suggestion for utilising rubber waste.

Nearly all waste rubber is used over again in some form or other. Factories have been established in Europe for the express purpose of reclaiming waste rubber such as old rubber shoes and used bicycle tyres. But it should be pointed out at the outset that by no one of the reclaiming processes at present in use is it possible from vulcanised waste to reproduce unvulcanised (de-vulcanised) rubber. The sole result of reclaiming processes as now applied is to render the rubber plastic again. For example, cut sheet waste is generally reclaimed by heating with alkali. It is not possible to prevent the waste in question from becoming more or less dark in colour as the result of the heating and subsequent plasticising process (during which process the caustic liquor is washed out of the rubber). As a result of such treatment with caustic soda, and subsequent heating in steam at a pressure of about 5. to 8 atmospheres in order to render it plastic, cut sheet waste yields a product which can be more or less used in

the place of raw rubber in a number of mixing. The vulcanisation coefficient of such a product is very low, and there is, therefore, room for a considerable degree of after-vulcanisation.

Catgut from Sheep.

1614. A. R., Sialkot City.—Asks how to prepare catgut from sheep.

For the manufacture of catgut the sheep intestines should be fresh—free from decomposition. They are first cleaned from faecal matter and washed; they are then soaked in a tub of water and deprived of adhering fat. The smaller ends are then tied together and laid on the edge of the tub, while the remainder are allowed to steep in the water for several days, the water being frequently changed. The peritoneal and mucous coats are then removed by placing the intestines towards the larger end. The gut is next soaked in water for 24 hours, and afterwards scraped clean upon the bench with the rounded back of a knife. About 8 of the larger ends are now cut off for use by the sausage makers; the remainder are cut into lengths and stratified with salt, which is termed curing. After remaining in the salt for some days they are immersed in a ley composed of pearlash 8 oz. dissolved in water 4 gallons. The ley is poured over the intestines and every two or three hours the liquor is poured off and the intestines are examined to ascertain if they have been sufficiently acted upon by the alkali. They are next drawn several times through a brass thimble open at both ends, and then sorted, according to their

sizes, for the different purposes to which they are to be applied.

Manufacture of Saccharin.

1539. S. S. T., Fatehgarh.—Is inquisitive about the manufacture of Saccharin.

Saccharin is a benzoic acid derivative, used as a sweetening agent. It is prepared by treating toluene with sulphuric acid at a temperature not exceeding 100° C when a mixture of ortho- and para-toluene sulphonic acids in about equal proportions is formed. The mixture is oxidised with dilute potassium permanganate solution, yielding the corresponding benzoic acids. The potassium salts of these acids are treated with phosphorus pentachloride, giving certain chlorides of similar form. On treating these bodies with ammonia, the para derivatives yield the diamide whilst the ortho-compound gives ammonium ortho-sulph amido-benzoate. These are separated by the greater solubility of the latter in water; its aqueous solution when decomposed with an acid yields saccharin which is chemically known as anhydro-ortho sulphamido-benzoic acid, or benzoic sulphimide.

Milk Powder.

1566. K. S. S. I., Mysore.—Wants to learn the process of manufacture of milk powder.

Several processes for completely removing the water from milk have been invented and are in more or less successful operation. The resulting product is in the form of a creamy white powder which upon agitation readily united with water thus restoring the milk. A patent-

ed process consists of complete drying of milk in a vacuum machine known as an exsiccator. In this process the milk is first sprayed upon the bowl-shaped ends of a revolving drum. In this step of the process a considerable amount of moisture is removed. The condensed milk resulting is then sprayed upon the cylindrical surface of the drying drum and the remaining moisture is removed during one revolution of the drum. Knives or scrapers having a bearing upon the surface of the drum cut the film of dried milk from the drum and it falls in a film into a receiving chamber, which is separated from the large drying chamber by two air-tight gates or locks, thus providing for the removal of the dried product without breaking the vacuum or stopping the process. This arrangement of product chambers and locks permits of a continuous operation of the machine.

After the product has been removed from the exsiccator it is cooled and then milled upon specially constructed kilns.

Rubber Solution.

1589. S. S. T., Fatehgarh.—Wants a recipe for rubber solution.

A good rubber solution is made up of 100 parts of finely chopped rubber, 15 parts of rosin, 10 parts of shellac; these are dissolved in bisulphide of carbon.

Disinfecting Fluid.

1645. I. P. S., Jhansi.—Wants a recipe of disinfecting fluid.

Common resin (ground)	2 cwt.
Caustic Soda (Commercial)	50 lbs.
Water	40 gal.
Crude Creosote (Tar Oil)	35 gal.

Boil caustic soda in 15 gallons of the water to form a lye, then add the rosin boiling until dissolved and saponified, then pour the remaining water in by degrees, and add about 20 gallons of heat, then pour the remaining tar oil into the pan, stir, cover over, cool down; then fill cans and drums. It perfectly emulsifies when mixed with water.

Worcester Sauce.

1735, P. N., Hyderabad.—Wants recipe of Worcester Sauce.

Garlic	12 oz.
Shallots	28 "
Tamarinds	28 "
Cloves	4 "
Powdered Capsicum	4 "
Anchovies	3 lbs.
Oil of lemon	1 oz.
Sugar	4½ lbs.
Soy	7 lbs.
Vinegar	5 gals.

Macerate for seven weeks, with frequent stirring, and strain.

Sealing Wax.

1756. K. L. S., Poona City.—Wants a recipe of sealing wax.

Take 4 oz. of very pale shellac; cautiously melt in a bright copper pan over a clear charcoal fire, and when fused add Venice turpentine 1 oz.; mix and further add vermilion, 3 oz.; remove the pan from the fire, cool a little, weigh into pieces, and roll them into circular sticks on a warm marble slab by means of a polished wooden block. Polish the sticks with a rag when quite cold.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited Enquiries or replies from our experts will be published free of charge Questions are not generally replied by post]

1428 F S Mysore—Books on automobile engineering may be had of Chakraverty Chatterjee & Co., College Square, Calcutta

1429. U M. T. C. Dindigul—Gurbadhini, Hanaka Lane, Palghat and Kavana Kaumudi Kottakal are the two monthlies of Malabar For books on leather dyeing enquire of Chakraverty Chatterjee & Co., Ltd., College Square, Calcutta Colours may be had of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta Can supply coloured book binding leathers and tanned sheep and goat skins

1430 K B Faizpur—A formula for infants' cordial appeared in February 1926 Indian Sarsaparilla appeared in April 1921

1432 J. A B Bombay—Please write letters to the querist under care of Industry Office when your letters will be duly redirected

1433 M A Kumbakonam—The following are the hide and skin dealers of American Besse, Osborn & Odell Inc, 51 South Street, Boston, Mass; New Castle Leather Co., Inc, 75, Cliff Street, New York, S J Kibler & Bros Co, New Washington, O; Hunt, Dankin Leather Co, 196, Beach St., Boston, Mass; Hugo Brand Leather Co., 178, William Street, N Y.

1434 V. D Tanuku—Iron chairs, cots, etc, may be had of Puri Iron Works, Gujrat (Pb) Pure scents may be had of Paradise Perfumery House, 82, Colootola St, Calcutta Wooden furniture may be had of Petambhor Sarkar & Co; D N. Doss & Co, both of Bowbazar Street, Calcutta. Aluminium wares may bad of Jeewanlal & Co, 55, Canning Street, Calcutta

1435 B D S C., Delhi—Engraved sandal wood boxes may be had of The Mysore Agency College Street, Calcutta.

1436. A. L. A. Bharatpur—Swadeshi lead pencils may be had of The Madras Pencil Factory, Washermanget, Madras and F. N Gupta & Co, 13, Belliaghata Main Road, Calcutta.

1438. K C. Nagaram—For thread balling machines please enquire of The Oriental Machinery Supply Agency, 201, Lalbazar Street, Calcutta

1442 (A subscriber) Kathor—The sugar generally had in the market is cane sugar You may use impure copier sulphate

1443 M H P G Meduk—Wants to be put in touch with sellers of Bombal Fish You can advertise in the pages of this journal for selling Biri leaves, stick lac, etc Foreign matches may be supplied by F P. Nalladaroo & Co, 501, Canning St, Calcutta and Lal Chand Bros, 331A, Central Avenue; both of Calcutta Cigarettes will be supplied by Karim Bux & Flahie Bux Bros, 58, Canning Street, Calcutta. Beads may be had of Amin Chand Mehra & Sons, 34, Armenian St, Calcutta For Tungstic acid try C Biswas & Co, 125, Bowbazar St, Calcutta Rubber balloons may be had of Ali Mohamed Akbar Ali, 221, Lower Chitpur Road, Calcutta Write for the prospectus of the electrical courses in any technical school, say, Bengal Technical Institute, Jadavpu, near Calcutta For American flour enquire of American Corn Products, 4, Hare St, Calcutta

1444 T A M C. Bhusawal—Leather suit cases may be had of W S Dossen & Co, College St, Market, Calcutta.

1446 K S C Kainganj—The names and addresses of the exporters and manufacturers of all the articles listed by you can be found in Kelly's Directory of Merchants and Manufacturers of the World Dietz lanterns are imported by Elliot & Co, 7, Clive Row, Calcutta Sun light soap may be supplied by M Framrose & Co, 9, Bank St, Fort, Bombay.

1448 K. M. S P. Negapatam—Such a large quantity of butter cannot be obtained from milk as you mention. The suggestion is a bogus one. Formula for vegetable fat similar to ghee appears in June 1926 issue

1449 K. P. Guntur—The proportion of adulteration in soap depends upon the quality of the resulting product Try one-fourth

1450 A S E Ernakulam—Your enquiry being in the nature of an advertisement cannot be dealt with in this column

1452 K M M W, Karachi—Your name has been entered in our office directory

1453 D M S C, Madras—Wants to be introduced to dealers in snuff of Calcutta

1454 J G W, Ferozabad—Crucible for melting glass may be supplied by Murata & Umetani, Shoten, 6 Ichome, Sannomyacho, Kobe, Japan

1455 B S K, Poona City—Dissolve $\frac{1}{2}$ lb sodium carbonate in 1 oz water Sweeten 1 quart milk with 1 lb sugar Add the milk to the water and boil down the whole to thickness Spread the mass in a layer on a plate and hold over a slow fire The mass will become crisp and can be finely powdered The product will be equal to milk powder For selling fumigating pills manufactured by you advertise on the pages of newspapers and periodicals

1456 N S, Benares—Embroidery machines may be bought of Singer Sewing Machine Co, Esplanade Marion, Calcutta Recipe of hair dyes will be found in January 1925 issue

1457 A N Surat—Vide No 1456 above

1459 M S, Calcutta—Sewing thread is made from cotton thread Process of making sewing thread appears in this issue You should read books on jute spinning You

may manufacture orange colour from Kusum flowers, the manufacturing process of which appeared in July 1925 issue

1460 C C Bros, Chalkhoa—For selling ivory and elephant's bones you may correspond with the following parties Hiralal Baldevdas, 80/82, 3rd Bhoiwada, Bhuleswar, Bombay; E Talati 37/6, Canning Street, Calcutta; Williamson Magott & Co, 4, Mangoe Lane, Calcutta and Fonear & Co, 70/B, Lewis Street, Rangoon

1461 G T S, Vizagapatam—Optical goods may be supplied by American Optical Co, Ltd, Hatton Garden, London, F C 1; Key Lens Optical Co, Ltd, Exchange Station, Tithebarn Street, Liverpool; F Solomon & Thomassohn 4, Leipzig, Germany; Omfa, Grunb H, Landwirthstrasse 14, Munich, Germany; Merry Optical Co, Kansas City, Missouri, U S A and Standard Optical Co, Geneva, New York, U S A

1462 P M R N, Newapatam—For books regarding Mount Everest expedition write to Thacker Spink 3, Esplanade, East, Calcutta

1463 J T, Aimer—Adulterate the soap with a quantity of sodium silicate whereby detergent property will increase. Formulas of toilet and laundry soaps appeared in the last volume of **Industry**.

1464 J L S C, Lansdowne—Vegetable products are imported by Ralli Bros & Co, 1 & 2, Church Lane and Shaw Wallace & Co, 4, Bankshall Street; both of Calcutta For lamps try Mahomed Ebrahim & Co, 66, Chuckerla Street, Bombay; K L Mehta & Co, Opp. Hathi Bldg, Kumbadevi Road, Bombay; Phani Bhusan Kundu, 85, Harrison Road, Calcutta and Lalit Mohan Kundu & Makhani Lall Kundu, 192, Old China Bazar Street, Calcutta Electric lamp, magic wire, etc., may be had of K. G Maniar, 55/1, Canning Street and the Union Trading Co, 166, Harrison Road; both of Calcutta

1465 P B, Bhutan—Your enquiry being in the nature of an advertisement should not be dealt with in these columns. You better advertise in the Sale, Exchange pages of **Industry**.

Golden Chance

FOR PERFUMERS & SOAP-MAKERS.

Give trial order Satisfaction guaranteed All makes. All Sorts All qualities Avail yourself of our long-standing experience in Perfumery line, and our big stocks of varied Foreign Essential oils, Ottos, Extract and other Raw Materials; White Oil, Empty Glass phials. Corks, Capsules and other Fancy Packing material too numerous to detail.

SIKRI & CO.,

POST BOX No. 2287. CALCUTTA.

1466 S. A. G., Kamareddy—You may start an automobile repairing workshop. It will be profitable no doubt, but success will depend much upon efficient management and organisation. You may invest Rs. 5,000 to Rs. 10,000 for this business.

1467. R. C. N., Nigam—An article on snake-bite cures will be found in the last issue. As regards hernia cure consult a physician. For waterproof enquire of Bengal Waterproof Works, 2, Nazarah Lane, Calcutta and Safina & Co., Chandra Chowk, Delhi. Stationery articles may be bought of Nilmoney Halder & Co., 106, Radhabazar Street, Dass & Co., 60, Sikdar Bagan Street, and F. N. Gupta & Co., 12, Balpaghata Road, all of Calcutta.

1468. C. K. S., Chemarayapatne—For cinema photo taking cameras enquire of The Photographic Stores & Agency Co., 154, Dharamtola Street, and Calcutta Camera House 158, Dharamtola Street, both of Calcutta.

1469 K. T., Puloty-West—Wants to buy paddy, rice, gram, etc., in large quantity. First of all bleach your clothes with bleaching powder available in the market. Then wash with soapnut solution and soap. This is also applicable in case of silk fabric. But bleaching is not necessary. Soapnut is the best thing for washing silk goods.

1470 D. D. L., Cawnpore—Recipes of Mukh Bilas and similar other articles will be found in December 1925 issue. Books may be supplied by R. R. Donnelley & Sons Co., Chicago, Illinois; Gillespie Bros., Inc., Stamford Connecticut; Rand Mc Nally & Co., Chicago, Illinois, and West Publishing Co., St. Paul, Minn.; all of U. S. A. For industrial books enquire of Thacker Spink & Co., 3, Esplanade East and Chackraverty Chatterjee & Co., Ltd., 15, College Square; both of Calcutta. The indigenous spices you require may be had of Madhab Chandra Daw, 4, Armenian Street and Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar; both of Calcutta.

1471. R. R. G., Kaimganj.—Elephants are mostly found in the forests of Assam and Burma. Elephant's bones are utilised for various industrial purposes, such as handles of

walking sticks, umbrella, knife, etc. Addresses of parties interested in elephants' bones appear under No 1460 above.

1474 S. J. J. V., Bilimora.—Process of manufacturing vegetable ghee appeared in June 1926 issue. Wants the address of the agent of W. H. Spence & Co., Hitchin Herts, for Spencer Hopwood patent boiler. Desires to be introduced to seed and cake exporters of Bombay and Calcutta.

1475 T. K., Kuttapurambu.—Guns and cartridges may be supplied by Colt's Patent Fire Arms Mfg. Co., Hartford, Connecticut, U. S. A., London Armoury Co. Ltd., 31, Bury's Street, St. James, London, S. W. 1 and The London Small Arms Co. Ltd., Old Ford Road, London, E. 3.

1476 A. N. B., Ludhiana.—For book regarding Wembley Exhibition enquire of High Commissioner for India Grosvenor Garden, London. For other books write to Government Central Book Depot, 8, Hastings Street, Calcutta.

1477 D. J. A., Wadhwan Camp.—For carbolic acid gas generating machines write to Read Machinery Co., Inc., York, Pennsylvania; Buffalo Foundry & Machine Co., Buffalo, New York and Glamorgan Pipe and Foundry Co., Lynchburg, Virginia, all of U. S. A.

1478 R. L. K., Saigodha.—There are no such schools known to us. Refer your other query to the Emigration Officer, Delhi.

1480. J. F. D., Myingyan.—It is not practicable to extract oil from litharge.

THE ONLY TIME TO ENCOURAGE. SWADESHI INDUSTRY.



Purchase KIRLOSKAR PUMPS.

Write for full particulars to Sole Agents—for India, Ceylon, etc.

K. B. JOSHI & CO.,
321, Hornby Road, Fort, Bombay,
Post Box No. 534

Calcutta—84A, Clive St.,
Post Box No. 675

Karachi—Bunder Road,
Post Box No. 230.

Madras—Post Box No. 1260

Note.—All kinds of Myers Pumps
as shown in the block can be
had of us at moderate prices.

1481. C. N., Dindigul.—For bleached shellac enquire of Madhab Chandra Daw, 4, Armenian Street, Calcutta

1483. S. R., Holi.—For industrial books enquire of Chackraverty Chatterjee & Co., Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta Soap stamping apparatus may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lal Bazar Street; both of Calcutta.

1484. P. F. G., Alwaya.—Furniture may be supplied by Chatterjee & Co., 30, Bowbazar Street; Choudhry Burdhan & Co., 49, Bowbazar Street; Petamber Sircar & Co., 47, Bowbazar Street; all of Calcutta Furniture may also be supplied by Northern Furniture Co., Sheboygan, Wisconsin; Royal Furniture Co., Grand Rapids, Michigan and Phoenix Furniture Co., Grand Rapids, Michigan; all of U. S. A. A process of a damp-proofing matches appeared in September 1923 issue Match chemicals may be had of Champaklal & Bros., 72, Canning Street, Calcutta Process of seasoning timber appears elsewhere in this issue

1485. S. S. H., Idgunda.—Plantain fibre may be used in manufacturing fabrics. It is in demand in England For further particulars go through the August 1921 issue of *Industry* that contains an elaborate article on plantain fibre industry To communicate with the advertisers write them direct under care of *Industry* when your letters will be duly redirected.

1486. N. S. K., Ambalangoda.—Wants to buy agate

1490. C. P. E. C., Nagpur.—For electroplating plants enquire of T. E. Thomson & Co., 9, Esplanade East, Calcutta For acids and salts used enquire of D. Waldie & Co., 1, British Indian Street and B. K. Paul & Co., 1/3, Bonfields Lane; both of Calcutta.

1491. R. L. A. P., Lucknow.—Brass sheets may be supplied by American Brass Co., Waterbury, Connecticut, Rome Brass & Copper Co., Rome, New York; Detroit Copper & Brass Rolling Mills, Detroit, Michigan and Cleveland Brass & Copper Mills Inc., Euclid, Ohio; all of U. S. A.

1492. D. P. S., Baridilly.—For brushes required enquire of H. Davis & Co., Cawnpore, Brushwares Ltd., 12/1, Halsey Road, Cawnpore and Calcutta Brush & Fibre Co., 172, Bowbazar Street, Calcutta.

1494. M. K. M. K., Rangoon.—Urdu type is not perhaps available. Printing in Urdu and Persian is done by lithography

1495. P. L. M., Madras.—We do not deal in any article We only furnish our constituents with necessary information For cardboard boxes of required design enquire of H. L. Sett & Sons, 8, Nilmony Mitter Street and Bengal Cardboard Box Manufacturing Co., 64/1, Mechua Bazar Street; both of Calcutta.

1496. G. B. B., Nagpur.—Consult a mechanical engineer.

1497. M. R. Hoshangabad.—“Gota” is a narrow bordering with the badla form of gold wire as the warp and silk as the weft.

1499. P. H., Cheirapunjai.—For hair oil go through the booklet *Hair Oil Manufacture* published from this office

1500. A. C. S., Colombo.—Leather suit cases, etc may be had of W. S. Dossen & Co., Post Box No. 7864, Calcutta Coal tar may be had of the Barakar Coal Co., Ltd, Mfg. Agents Burn & Co., Honkong House, Council House Street, Calcutta; The East Indian Railway Co., Giridih; The Tata Iron & Steel Co., Jamshedpur, B. N. Ry. and The London Colliery Co., Ltd, Mfg. Agents Turner Morrison & Co., Ltd, 3, Lyons Range, Calcutta.



**Cheapest House For
SPORTING GOODS
Silver Medals, Cups &
Shields.**

**Fine Silver Medals in
Velvet lined cases.**

Rs. 3/12/- each.

**Largest Stock & Variety
Illustrated Lists Free.**

**CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

1501. K. P. K., Poona City.—Process of preparing vinegar appeared in the last issue. Almost all the recipes you require appeared in the last volume of **Industry**.

1503. K. V. S., Rajahmundry.—Consult a physician.

1504. M. M. C., Tinsukia.—For indigenous herbs and drugs enquire of Bansidhar Dutt & Sons, 126, Khengraputty; Madhab Chandia Daw, 4, Armenian Street and Jadunath Ghar, Hukkaputty, Bara Bazar; all of Calcutta.

1505. V. K., Pudukottai.—Colours of all descriptions may be had of Amin Chand Mehra & Sons, 34, Armenian Street and Hansraj Vishram, 13, David Joseph Lane; both of Calcutta.

1507. T. A. M., Bhusawal.—Steel trunks may be bought of Bombay Trunk Depot, 141, Abdul Rehman Street and General Trunk Depot, Abdul Rehman Street; both of Bombay. Wants to know the address of Pearson Butter Dairy of Bombay.

1508. D. G. S., Poona City.—For brick and tile making machines write to Manollasini & Co, Mangalore-Kankanady.

1509. S. J. V., Bilmora.—Coal is exported by Andrew Yule & Co, Ltd, 8, Chive Row, Calcutta; Balmer Lawrie & Co., 103, Chive Street, Calcutta; N. C. Sircar & Sons, 7 Swallow Lane, Calcutta; Indian Coal Co, Kavarana Bldg, 283, Hornby Road, Fort, Bombay; Bombay Coal Trading Co., 10/74, Hanji Street, Bombay and Bombay Bengal Coal Co., 21/23, Esplanade Road, Bombay

1510. K. C. D., Daltonganj.—No such institution is known to us

1512. T. D. R. Bros., Colombo.—Desire to be put in touch with manufacturers of Indian silk and cotton piece-goods, banians, socks and stockings and handkerchiefs.

1513. N. L. & Co, Lansdowne.—Wants the full address of J. R. of Calcutta, importers of Japanese handkerchiefs

1514. P. K. C., Matunga.—No such examination is held in India.

1515. A. K. B., Calcutta.—Process of preparing taral alta appeared in August 1924 issue of **Industry**.

1516. N. L. D., Dacca.—For B. S. A. cycles write to S. Dass & Co., Ltd., 71¼, Bentinck Street, Calcutta. Sporting goods may be had of Army & Navy Stores, Chowringhee, Calcutta. For sewing machines write to Contractor Bros., Kanpith Bazar, Surat

1517. S. A. T. Co, Bezwada.—For rubber tape enquire of Henley's Telegraph Works Co, Ltd, Henley House, Radha Bazar Street, Calcutta.

1518. G. C. & Co, Vellore.—Biri leaves may be bought of Moolji Sicka & Co., 51 Ezra Street and Chumal Purushottaindas, 128 Lower Chitpui Road; both of Calcutta.

1519. O & Co, Poona City.—Process of preparing perfumed tobacco appeared in October 1924 issue. Recipes of pain balm appeared in January 1926 issue. Process of preparing artificial gold appeared in July 1923 issue. For label printing write to Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta

1522. K. C. M., Banares.—Formula of preventing pitting from small pox appeared in October 1921 issue.

1523. R. L., Sialkot City.—You may use anla oil, recipes of which appeared in March 1926 issue.

1524. N. S., Lahore.—For disposing of saccharine advertise in newspapers and periodicals or you may approach local chemists individually.

1526. D. D. U., Dharwar.—Subject matter of your enquiry is under consideration; the result will be communicated to you by post

1528. S. S., Bina.—For securing suitable hut advertise in local newspapers.

1529. J. A. F., Tuticorm.—Safety matches are manufactured by East Bengal & Assam

SETT DEY & Co

ORIGINAL HOMEO PHARMACISTS,
42 Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations
Catalogue Free On Application.

Match Factory, Muktagachia, Mymensingh; Indian Match Manufacturing Co., Olavakot, S. Malabar; Burma Match Factory, Hanthawaddy, Burma; Belgaum Match Factory, Belgaum and Sultan Match Factory, Comptui, Ahmedabad. For cigarettes enquire of American Eastern Tobacco Corporation, 37, Canning Street, Calcutta.

1532 U. R. C. G. M., Colombo.—Match making machines may be bought of Bengal Small Industries Co., 91 Durga Charan Mitter Street and Bhawanji Engineering & Trading Co., 122½, Upper Circular Road, both of Calcutta.

1533. S. & Co., Nadiad.—For gramophone records write to Gramophone Co., Ltd., 133, Bellaghatta Road, Calcutta. Want to buy curd soap.

1534. S. C. N., Calcutta.—You have to evaporate water not by means of direct heat but by means of heat generated from steam.

1536 T. T. T., Kottayam.—For cinery paper please enquire of Chowdhury & Co., 71½, Clive Street and Dey & Co., 41½, Clive Street, both of Calcutta.

1537. B. B. S., Sibapuri.—Cloths may be supplied by Charles Senon & Co., Ltd., 25, Bolton Road, Bradford, C. & W. Wainley, 61, High Street, Manchester, C. Itoh & Co., Ltd., 51, Azuchimachi 2, Chome Osaka, Japan, Santram Kanhaiyalal, 108, Sutapati, Bara Bazar, Calcutta, Filokchand Rai Mal, 61, Cross Street, Calcutta, Mathuradas Liladhar, Seth Mulji Jetha's Market, Gordhan Gali, Bombay and Dev Chand Bank Chand, Seth Mulji Jetha's Market, Dadar Lane, Bombay. Yarn may be had of Anandji Valabhdas & Co., 231, Shaikh Memon Street, Bombay; Madgavkar & Co., 4, Strand Road, Calcutta; Sherif Damji & Co., 9, Zakariah Street; Calcutta and E. Reise

Mulhausen, Thur, Spielbergstrasse 46, Germany. You may try to insert your name in Kelly's World Directory, 182-184, High Holborn, Viaduct, London, W. C. 1. In washing long cloth you may follow the general washing principle. For importing goods you may go through **Commercial India**, the sister journal to **Industry**.

1538 F. C., Ambala City.—No such society is known to us.

1543 S. R., Calcutta.—For gall-nuts enquire of Banshidhar Dutt & Sons, 125, Khengraputty, Bara Bazar, Madhab Chandra Daw, 4, Armenian Street and S. N. D., P. O. Box No 7851; all of Calcutta. For tablet making you may approach Dr. D. Witter & Co., 43, Bowbazar Street, Calcutta.

1546 V. K. G., Nanaghat.—For soap moulds you may write to Oriental Machinery Supply Agency Ltd, 20½, Lall Bazar Street, Calcutta. Needles for knitting machines may be bought of E. B. Bros & Co., 11, Dharamtala Street, Calcutta.

1547. E. R. R. G., Ingur.—You may go through The Dyeing & Textile Fabrics by J. J. Hummel and The Art of Dyeing by Dr. P. C. Ray; both the books may be had of Book Co., 4½A, College Square and Chakraverty Chatterjee & Co., Ltd., 15, College Square; both of Calcutta.

1548 S. V. S., Singarem.—Lace making requisites may be supplied by E. B. Bros. & Co., 11, Dharamtola Street, Calcutta. Wants to be introduced to lace exporters of India.

1549 H. N. R. B., Bangalore City.—For the books required enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1550. S. P. M., Mirjan.—The fibre of betelnut husk is important, because of its capability of being turned to many useful purposes, specially as it has a soft and cotton-like feel, and is capable of being spun into twine. The fibre may also be found capable of being made into paper.

1551. R. C. G., Mohpani.—Jeweller's tools may be had of L. Basack & Co., 5, Old Court House Corner, Calcutta.

PARADISE PERFUMERY HOUSE COMPLETE HOUSE FOR

Essential Oils, Synthetic Perfumes and
Raw Materials for Soaps, Hair Oils
and Aerated Water requisites
Catalogue Free on request.

75, Colootolah, CALCUTTA.

Telegram.—"Lavender."

Phone 2695, B. B.

1553. R. C. S., Kharsin.—The machines you require may be had of T. E. Thomson & Co., 9, Esplanade East and Burn & Co., Hongkong House, Council House Street; both of Calcutta.

1554. M. T. D., Pyuntaza.—For directory write to Thacker Spink & Co., 3, Esplanade East, Calcutta and The Standard Publicity Co., Railway Road, Lahore.

1555. F. C. G., Agra.—You may go through Uebersee Post, 10, Solomonstrasse, Leipzig, Germany.

1559. L. A. K., Savantvadi.—For the patent medicine you require enquire of Martin Harris, 8, Waterloo Street, Calcutta. For the book write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

1560. T. V., Rajahmundry.—For laundry machine enquire of Synnington Cox & Co., Commercial Bldg, Clive Street, Calcutta. Your other enquiry being in the nature of an advertisement should not be published in these columns.

1561. E. T. C., Delhi.—For catalogues of automobile accessories write to Leslie & Co., 19, Chowringhee Road; Stuart & Co., Ltd., 3, Mangoe Lane, A. Milton & Co., Ltd., 156, Dharamtala Street and French Motor Car Co., Ltd., 234/3, Lower Circular Road; all of Calcutta.

1562. P. D., Agra.—As far as our information goes the address of the dealer of the sex indicator is correct.

1563. R. N., Indore City.—City and Guild Examination of London University is held regularly in India. For particulars enquire of Director of Industries, Bengal, 40/A, Free School Street, Calcutta.

1564. N. P., Benares City.—You may write to Jordan Marsh & Co., Fremont Street, Boston and Curator Boston Art Museum, Boston, Massachusetts; both of U. S. A. whether they are willing to take curios from you.

1565. G. C. M. B., Macca.—Process of extracting essences direct from flowers appeared in June 1926 issue. Process of fermenting cane-sugar in making vinegar appeared in the last issue.

1567. N. P. L., Rohri.—A good recipe of white coconut oil soap appeared in January

1926 issue. In washing silk cloth use soapnut. For dry washing you will have to use laundry machinery.

1568. A. C. P., Travancore.—For medical books enquire of Butterworth & Co., 8, Hastings Street, Calcutta. For hair oil making you may consult the booklet Hair Oil Manufacture published from this office.

1569. M. L. B., Bundi.—In using oil see that the weight of the oil does not exceed double the weight of the lye used. Use some what stronger lyes.

1570. R. S. B., Cochin.—Wants to buy wick for candles.

1571. G. B., Behabari.—For umbrella cloth enquire of Bird & Co., Chartered Bank Bldgs., Clive Street; Ralli Bros. & Co., 1 & 2, Church Lane, and Graham & Co., 9, Clive Street; all of Calcutta. Umbrella fittings may be bought of Nafai Ch. Atta, 13, Armenian Street and Tejpal Bredhichand, 711, Armenian Street; both of Calcutta.

1573. S. N. H. Z., Bimori.—Derby sweep tickets are sold among the members of the Royal Calcutta Turf Club; it is not possible for a non-member to secure a ticket. Your other query has already been replied.

1571. H. S., Bahraich.—A good recipe of harmless hair dye in powder appeared in September 1922 issue.

1576. R. S. M. Sons Jaipur.—For calendar printing you may write to Calcutta Fine Art Cottage, 76, Dharamtala Street; Mahila Press, 27, Patalbanga Street; both of Calcutta.

Kaminia Oil

(Regd.)

Finest dressing for the Hair. Delicately perfumed. Re. 1/- per bot charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot of $\frac{1}{4}$ ounce Rs. 2/-, $\frac{1}{2}$ ounce Re. 14/-, V. P. & Packing extra.

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,
P.O. Box 2062, Juma Masjid, Bombay.

1577 M. V. E., Taunggyi.—Process of manufacturing mantles appeared in December 1923 issue. For industrial books enquire of Chackraverty Chatterjee & Co., Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East, both of Calcutta. For small gears try Eastern Machinery and Engineering Co., Ltd., 15, Canning Street and Peterson Engineering Co., Temple Chambers, 6, Old Post Office Street, both of Calcutta. For camera parts enquire of Calcutta Camera House, 158, Dharamtala Street and The Photographic Stores & Agency Co., 154, Dharamtala Street, both of Calcutta. Your other enquiries are not in our line.

1578 G. D. J., Kashipur.—Following are some of the technical subjects suitable for a fairly educated young man: mechanical engineering, automobile engineering, commercial art such as block making, advertisement designing, etc. You may select any of the above subjects for your brother.

1579 H. S. R., Secunderabad.—No such institution is known to us.

1580 M. C., Manpur.—Knitting machines may be had of Economic Mills Ltd., 50/2, Dharamtala Street and W. H. Brady & Co., 26, Strand Road; both of Calcutta.

1582. C. P. M., Surat.—You may either pull out the cork or you may slightly heat the mouth of the bottle when it will expand and the cork will come out. For wooden boxes of required description write to A. Krishmann & Co., 6, Gauribaria Lane, Sham Bazar, Calcutta.

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College
USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers

Factory—Baranagar and Barisal,

Office—113, 114, Khargapotty St., Calcutta.

1583. C. N., Shahjehanpur.—Your query is unintelligible.

1584 A. N. Bangalore.—An article on Biri Making appeared in May 1925 issue of *Industry*. Khambira should not be used in biri making. Tobacco for biri may be had of B. B. Pandey & Sons, Katni and Lokras & Sons, Bara Bazar, Saugor.

1585 R. R. D., Moibang.—Process of distilling eucalyptus oil appeared in March 1923 issue. Wants to be introduced to dealers in limestone, slaked and unslaked.

1586 B. M. M., Sadhli.—Consult a mechanical engineer.

1587 A. K., Kallai.—For preparing a reverberatory hearth refer your query to an industrial chemist. Refer your other query to the Forest Department of your province.

1591 P. D., Calcutta.—Some hints on the fibres for manufacturing cordages appeared in the last issue. Please state what other information you want.

1593 E. T. C., Sadian.—For wooden case write to A. Krishmann & Co., 6, Gauribaria Lane, Shambazar, Calcutta.

1594 U. D. S., Raghunathpur.—Rosin is mixed with tallow or other fatty matters in proportion to 15 per cent to 25 per cent. Rosin increases the solubility in water, lathering properties and detergent power of the soap.

1596 D. R., Villanagram.—For mantles enquire of Welshbach Co., Gloucester, New Jersey and General Gas Light Co., Kalamazoo, Michigan, both of U. S. A. There is no such institution known to us. Results of New Idea Prize Competition have been published in June 1926 issue of *Industry*. Refer your query regarding wireless telephone to the Director of Post and Telegraph, Delhi.

1598 N. V. N., Bharno.—24 carat gold is pure gold. For polishing gold articles use rouge 180 grains make one tola. From this you will be able to calculate the weight of an ounce and penny-weight in tolas.

1599 B. B. M., Kaziranga.—Lac market has fallen greatly; you may correspond with Moran & Co., Mango Lane, Calcutta for disposing of lac. For selling cotton write to

Goolraj Ramcoomer, 94, Lower Chitpur Road; Calcutta; Mooljee Jethia & Co, 23, Pollock Street, Calcutta and Japan Cotton Trading Co., Ltd, D13, Clive Bldg., Calcutta.

1600. B G B, Panna.—Cotton seed oil, groundnut oil and many other vegetable fats and oils are ordinarily the adulterents of ghee. For testing purity of ghee analyse it, chemically.

1601. J S A, Bhandup.—Glass bottles and phials may be had of Bengal Glass Works, 39, Canning Street, Calcutta, Calcutta Glass and Silicate Works, Belgachia, Calcutta; Naini Glass Works, Naini, Allahabad and S K Dey & Co., 121, Shova Bazar Street, Calcutta.

1604 G B B Nagpur.—For tin boxes enquire of Ganaiand Rampettap & Co., 6, Halsi Bagan Road, Calcutta.

1605. M L M L K, Lahore.—Papers of all descriptions may be had of Ghose Bros., 61/1, Radha Bazar Street and Dutt Mukherjee & Co, 31, Jackson Lane, both of Calcutta.

1606 H C D Sylhet.—You may go through Dairy Farming in India by D J Megher & B E Vaughan and Poultry Keeping in India by Isa Tweed to be had of Thacker Spink & Co, 3, Esplanade East and Chakraverty Chatterjee & Co., Ltd., 15, College Square, both of Calcutta. The following is a list of dairy farms in India: Central Dairy Farm, 55, Mechuabazar Street, Calcutta, Edw Keventer's Dairy, 6, Lindsay Street, Calcutta, Australian Dairy Co, Bellasis Road, Byculla, Bombay; Devonshire Dairy Co, Chinchpogly, Bombay; Govind Dairy, General Patters Road, Madras; Scotland Dairy Farm, Khadia Golvad, Ahmedabad; Aligarh Dairy Farm, Aligarh, Government Military Dairy, Lahore Cantt; Diamond Dairy Farm, Cantonment Road, Lucknow and Dalhousie Dairy Farm Market, Lahore. Can supply raw "Shati."

1607. N S Ganjam.—The following are the paper mills of Bengal: Titaghur Paper Mills Ltd, Chartered Bank Bldg, Clive Street and Bengal Paper Mills Co, Ltd, 103, Clive Street; both of Calcutta. To correspond with a querist, write him with number and initials under care of **Industry** when your letters will be duly redirected.

1608. B. M., Agra.—Cardboard box making machines may be supplied by John Dickinson & Co, Mercantile Bldgs, and Ashutosh Addy & Co, 16, Lower Chitpur Road, both of Calcutta.

1609. K L R. C. S, Agra.—There is no such firm in Calcutta that deals in all sorts of motor oil Shell, B O C petrol, etc, you have to approach individual firm for each article. Shell may be supplied by Asiatic Petroleum Co, Ltd, 91A, Clive Street, Calcutta. B. O C petrol may be had of Burma Oil Co, Ltd, 101, Clive Street, Calcutta. I. B. P Petrol may be bought of Indo Burma Petroleum Co, Ltd, 8, Clive Street, Calcutta.

1611 P K, Mylapore.—No further process is known. As regards cocogem manufacture you will have to install big machineries costing some lakhs of rupees. Process of hydrogenation has been described in June 1926 issue. You will not be able to preserve ghee for long time in tin cases.

1612 P R K, Srinagar.—Aluminium vessels may be bought of Jeewanlal & Co, 55, Canning Street and Gobardhandas Maniklal, 60/3, Canning Street; both of Calcutta. Articles of china clay may be had of Calcutta Pottery Works Ltd, 45, Tangia Road, Calcutta; Gwalior Pottery Works Ltd, 21A, Radha Prasad Lane, Sukea Street, Calcutta and Satowri Dass & Co, 194, Old China Bazar Street, Calcutta.

1613 C I, Ahmedabad.—Seek an expert's advice for pencil manufacturing.

1615 A. R P, Aruppukota.—For statistical figures of groundnut write to the Director-General of Commercial Intelligence, 1, Council

FOR PUJA AND DEWALI

Manufacture Magic Wire and Pharaohs serpents under your own label by getting from us Magnesium wire in oz. rolls at Rs 14/- a lb, and serpent sticks at Rs 7/- a lb, Postage Extra. Samples at Re 1/- an oz. and Annas eight an oz respectively.

DURBAR TRADING &

MANUFACTURING CO.,

Katra Nihal Singh, AMRITSAR,

House, Street, Calcutta Groundnut is mainly used for extracting oil Groundnut is mainly exported to United Kingdom, Belgium, France and Italy Wants to be put in touch with exporters of groundnuts

1617 B D D, Camp Aden--For cameras required enquire of Arthur E. Morton, 259, High Holborn, London, W C. 1; Ausco Co., Binghamton, New York, U S A and Gorlitzer Camera Industrie, G Kugler & Co., Gorlitz, Germany

1618 M L Co, Roorkee.--Vegetable product is imported by Ralli Bros & Co., 1 & 2, Church Lane; Graham & Co., 9, Clive Street and Andrew Yule & Co., 8, Clive Row, all of Calcutta

1621 G N R, Vascode Gama --For plants and seeds enquire of Nurjehan Nursery, 9, Kankurgachi Lane, Calcutta

1622 V D, Sholapur--Small ice making plants may be had of Giacomo Jucker, Apollo Street, Box No 11, Bombay; Massey & Co., Ltd, Post Box 60, Madras and Sulzer Brothers, 11, Clive Street, Calcutta Business is profitable, but much depends upon demand

1623 P L, Amritsar--Refer your query to the Emigration Officer, Delhi

1624 A R S, Hoshiarpur--If you season the timber well there is less danger of white ants eating it Process of seasoning timber appeared in the last issue If you spread calomel solution on the timber it will be less affected Present address of The School of Chemical Technology is Neogi Pooker Lane, Calcutta Your other enquiries are receiving our attention.

1625 B R, Madras--It will be advisable for you to read some books on cement manufacture Books are stocked by Chakraverty Chatterjee & Co., Ltd, 15, College Square and

Thacker Spink & Co., 3, Esplanade East, both of Calcutta

1626 T V, Chikballapur--An article on hand made paper manufacture appeared in April 1920 issue.

1627 M M B, Bombay--For preventing fermentation use new and clean vessel on every occasion

1629 M R T, Bhandara --A recipe of vaseline pomade appears elsewhere in this issue You may use white oil as a basis for hair oil but it is very injurious to hair For formulas of patent medicines referred to by you consult a physician

1630 M H Ferozepur--For trade mark registration enquire of P. Lodge & Co., Post Box No 6772, Calcutta

1631 A C N, Calcutta Process of casting bell metal and bronze appeared in August issue For books on the subject you may enquire of Chakraverty Chatterjee & Co., Ltd, 15, College Square, and Thacker Spink & Co., 3 Esplanade East, both of Calcutta

1633 S R S Bros, Puri--Process of refining oil appeared in February and March 1921 issues Vernacular equivalent of Dextressa is not known For analysing you may write to The Superintendent, Alipore Test House, Alipore Process of softening hoins will appear in an early issue

1634 A E, Enakulam - Umbrella fittings may be supplied by Nafai Ch Atta, 43, Armenian Street, Calcutta Umbrella cloths may be had of Ralli Bros Co., 1 & 2, Church Lane and Tejpal Bredhichand, 711, Armenian Street; both of Calcutta

1635 A J D, Moradabad--Diamond may be supplied by New Thor Diamond Mining Co., P O Box No 627; North Kimberley Diamond Mine, Ottoskopp and New Vall River Diamond Exploration Co., Ltd, P. O. Box No 424; all of Kimberley, Union of South Africa, Diamond cutting apparatuses may be had of Chatteris Engineering Co., Ltd, 139 & 140, Gresham House, Old Broad Street, London, E C 2.

1635 B L S, Hardwar.--For books on printing and allied subject enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta

LIMITATION OF FAMILY

Third Ed. 5 Portraits, 55. Engravings.

357 Pages, Price Rs. 3. Postage Extra.

Every parent desiring to regulate the number of children according to his health and means will find it a God-send Ask for table of detailed contents which will be sent free

K. M. DAS & CO.,

29/1, Telepara, Sampooker St., Calcutta.

1636 A. H. D., Benares City.—Tin bottles required may be made to order of Gajanan Ramprotap & Co., 6, Harsi Bagan Road, Calcutta.

1638. T. V. N. I., Palur.—Collapsible tubes may be supplied by Venesta Ltd, Great Tower Street, London, E. C. 3. and Brooks Peel & Co., Ltd, 24, City Road, London, E. C. 1.

1639. J. N. N., Abohar.—You may prescribe condition powder to your cow-buffalo to increase quantity of milk. A recipe of condition powder will be found in July 1926 issue.

1640 N. G. R., Bezwa.—Magnetic stone may be bought of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Animal charcoal may be had of R. C. Gupta & Co., 84, Olive Street, Calcutta.

1642. M. W. M. H. K., Bundelkhand.—In order to hasten the period of refining oil you may simply filter through filter paper or flannel cloth as directed in the book. An estimate has been appended in the end of the book. For selling the printing press advertise in the pages of newspapers and periodicals.

1647. C. A., Tenali.—Glass phials required may be bought of S. K. Dey & Sons, 124, Shovabazar Street and P. S. Dutt & Bros., 8, Ezra Street, both of Calcutta.

1649 P. L. T., Jodhpur.—For the machine required write to Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

1652 C. G. S., Kalambar.—For "Dhenki" or multiple husker enquire of C. S. Sircar, 86/1A, Narkeldanga North Road, Calcutta.

1653. C. V., Narsapur.—Chemicals you want may be bought of Champaklal & Bros., 72, Canning Street and B. K. Paul & Co., 1/3, Bonfield Lane; both of Calcutta. Shellac may be had of Madhab Chandra Daw, 4, Armenian Street, Calcutta. Match making machines may be supplied by Bengal Small Industries Co., 91, Durga Charan Mitter Street and Bhawanji Engineering & Trading Co., 122/1, Upper Circular Road; both of Calcutta. For a book on hair oil manufacture you may write to Industry Book Dept Ink Manufacture is going to be published very soon from this office. For other industrial books enquire of Chakravartty

Chatterjee & Co., Ltd., 15, College Square, Calcutta. Process of preparing agarbattis appeared in May 1924 issue.

1654. R. B., Saugor.—For hair oil manufacture you may go through the booklet Hair Oil Manufacture published from this office.

1655. B. C., Hoshiarpur.—A good recipe of hair restorer will be found in May 1925 issue. You may take dyeing as a special subject for your study. You may go through Chemical Dictionary by G. N. Mytva to be had of the author at Ludhiana, Punjab. The Calcutta Dental College and Hospital, 261, Bow Bazar Street, Calcutta teaches dentistry. An article on boot polish manufacture will be found in May 1923 issue.

1656 A. R. K. B., Montgomery.—If you go through the July 1926 issue of **Industry** that deals with Cattle Problem of India you will get many suggestions for starting cattle breeding business.

1657 P. L. N., Relangi.—Your query being in the nature of an advertisement should not be published in these columns.

1659 M. I. P., Gadag.—Sewing thread may be had of E. B. Bros. & Co., 11, Dharamtola Street, Calcutta.

1660. S. H. H. R., Oudh.—Refer to 1657 above.

1663 M. P. S. C., Vizianagram.—For soap moulds enquire of S. A. Manan, 82, Machua Bazar Street, P. O. Amherst Street, Calcutta. Tallow may be bought of Calcutta Tallow Mart, 19, Tiretta Bazar Street, Calcutta. For vegetable oils enquire of Anath Nath Dey, 3, Moidaputty, Bara Bazar, Calcutta. For essential oils required enquire of Sickri & Co., 55/8, Canning Street, Calcutta.

1664 A. B. L. D., Benares.—For aluminum cases enquire of Jeewan Lal & Co., 55/1, Canning Street, Calcutta.

BOSE & COMPANY

General Order Supplier & Dealers In:

All sorts of Canes, Bamboo Root Polo Balls & Raw Products & etc. The best house for placing orders. If you are in need of anything please to book your order with.

BOSE & COMPANY,
23 Ram Rattan Bose Lane, Shambazar, Calcutta.

1666. K. D. M., Meerut Cantt.—Kashmir woolen goods may be supplied by Samed Shah & Sons, Fourth Bridge, Srinagar; Mohammad Jan & Sons, 4th Bridge, Srinagar; G M Buddoo & Co, Second Bridge, Srinagar and Ali Jan & Sons, The Bund; all of Kashmir

1668 R. C S, Calcutta.—You may utilize pineapples in manufacturing syrup. For syrup making you may go through Syrup Manufacture published from this office.

1669 N. M S, Nathdwara.—You perhaps mean collapsible tubes which may be supplied by Venesta Ltd, Great Tower Street, London, E. C. 3. Your other enquiries are in the nature of an advertisement hence these should not be published in these columns.

1670 H. S K., Multan City.—You may go through The Dyeing of Textile Fabrics by J J Hummel to be had of Chackraverty Chatterjee & Co, Ltd., 15, College Square, Calcutta. Silk is produced almost in all the provinces of India. For taking agencies write direct to the parties quoting references.

1671. S. K. A, Ambala City.—Homeopathic medicines may be supplied by Dr. Wilmar Schwab's, Homeopathic Central Pharmacy, Leipzig, Germany and Boenick & Tafel, 1011, Arch Street, Philadelphia, Pennsylvania, U S A

1675. V. S. N. M., Chatrapur.—Your previous letter has already been replied.

1679. S. K. K., Amritsar—"Kut" is known as costus in English. Costus root is similar to Elecampane both in external appearance and structure. It is an important spice, incense and medicine. It has been described as aromatic, stimulant and useful in cough, asthma, fever, dyspepsia and skin disease. It contains much inulin. For selling this and linseed, tea and other Himalayan products advertise in the pages of newspapers and periodicals.

1680 K. D. M., Ambala City.—You may write to the Principal, Jamshedpur Technical

Institute, Jamshedpur for prospectus of the institute where students are granted scholarship. For German fountain pens enquire of Venus Stationery Mart, Cossipur, Calcutta.

1681. M. N. S., Gujrat.—Mohwa oil when analysed is found to contain the properties mentioned in July issue under Formulas, Process and Answers columns. Mohwa oil may be had of The Chawla Rice Flour & Oil Factory, Gujranwala.

1682 A. C. S., Nilgiri.—You may prepare potato flour from potatoes according to the following process. Cleanse good potatoes, boil, peel and cut them in slices. Now add 100 parts of potatoes, 4 of salt, then dry thoroughly and grind them to flour. Keep the product in hermetically sealed tin containers.

1683 S. C. B, Dhamnagar—Redistil it

1684. S. S. P., Raja Rauli.—Your enquiries are not in our line. For the books you may enquire of Chackraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. Furniture may be bought of Adam Sajan & Co, 7, Bowbazar Street, Calcutta.

1685 P. C. N, Allahabad.—Your enquiry being in the nature of an advertisement should not be published in these columns

1686 M. L., Natunga.—No special process and technicalities are required for washing cloths.

1687 B. B., Muzaffarnagar.—An article on pig industry appeared in February 1926 issue

1688 D. M. M., Jamnagar.—Wants to be introduced to imitation gota dealers of Bangalore.

1690 Ismail Shariff & Co., 102, North Bridge Road, Singapore.—Hats are manufactured by Eastern Hat Manufacturing Co., 61, Charackdanga Road, Belliaghata; Peninsular Hat Manufacturing Co., 12 Baloohukak Lane and solar Eclipse Hat Manufacturing Co, 19/1, Jhowtolla Road, Ballygunge; all of Calcutta. Compressed fibre suit cases may be had of S. S. Basu & Bros., 34, Gopee Mohan Dutt Lane, Baghbazar, Calcutta. Leather bags may be bought of W. S. Dossen & Co., College Street Market, 21, Swadeshi Mart, Calcutta. Steel trunks may be bought of Basack Factory, 3,

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London Diploma Examination in December
TUITION FREE BY POST

Apply Prospectus

PAITHANKAR,

POST JUNNAR, (Poona.)

Brojo Dulal Street, and Subol Factory, Prasanna Coomar Tagore Street; both of Calcutta.

1693. D. R., Vizianāgram.—Process of preparing tea tablets appeared in July 1923 issue. In preparing coffee tablets the same process may be followed. For particulars of the school write direct to the school authority.

1694. P. A. S., Bangalore.—Tin boxes may be bought of Gajanand Rampratap & Co, 6, Halsi Bagan Road, Calcutta. Your idea is workable and it may prove profitable in future. For selling soap nut you may correspond with Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar, Calcutta. Best thing for you will be to insert advertisement in newspapers and periodicals.

1695. N. L. C., Jullundur.—Refer your query to the students Information Bureau, 7, College Square, Calcutta.

1697. M. K., Insein—Refer your query to an Ayurvedic physician. We are not aware of the process.

1699. S. H. K., Bombay.—Further particulars are not available regarding origin of colours as it is still in its experimental stage.

1700. G. M. K. & Sons, Calcutta—To correspond with Dr. D. Clouston write him under care of The Agricultural Adviser to the Government of India, Pusa.

1705. C. C. D., Nadiad—The pain balm referred to by you is a patent article, the recipe of which is a trade secret.

1706. R. S. B. S., Boha.—Wants to buy hen, eggs, fowls, chickens, etc.

1708. K. C. C., Nagaram—Eucalyptus oil may be bought of our advertisers K. G. Kamat & Co., Bombay, No. 4.

1711. J. N. B., Hughli.—For industrial books enquire of Chackraverty, Chatterjee & Co., Ltd., 15, College Square, Calcutta. You may also go through Industry Office publications.

1713. N. A., Vaniyambadi—Mantles may be had of Fani Bhusan Kundu, 85, Harrison Road, Calcutta and London Eastern & American Trading Co, Hammum Street, Fort, Bombay. Glass bangles may be had of Md. Abdul Gaffar, 133, Canning Street; F. Nalladaroo & Co., 50/1,

Canning Street and S. Abdul Aziz, 52, Canning Street; all of Calcutta. Patent medicines may be supplied by Martin & Harris, 8, Waterloo Street, Calcutta.

1714. P. E. B., Sialkot.—You may learn block making in Government School of Art, 28, Chowringhee, Calcutta.

1715. G. R. B. B., Lahore.—For sheet metals enquire of Balmer Lawrie & Co., 103, Clive Street, Calcutta, K. D. Chatterjee & Co., 15, Woodmunt Street, Calcutta and E. A. Currim, 97, Apollo Street, Bombay.

1716. C. H. S., Ahmedabad—Japan Directory is published by The Imperial Commercial Museum, The Department of State for Agriculture and Commerce, Tokyo, Japan.

1719. R. P. G., Katni—For engaging labourers write to tea estates, various factories and shipping departments.

1720. D. J. A., Wadhwan Camp.—It will be advisable for you to secure carbonic acid gas locally instead of importing from foreign countries. Carbonic acid gas may be supplied by The Deccan Sugar & Alkali Co, Ltd, Samskot and Cawnpore Aerated Gas Co, Ltd, Carbondale Works of Begg Sutherland & Co, Ltd, Cawnpore.

1721. M. F. Boh—Mill stores may be supplied by Bombay Mill Stores Supply Agency, 19, Bank Street, Fort, Bombay, British India Mill Supply Co, Tamarind Lane, Fort, Bombay, Chimaullal Kalidass & Co, 3, Tamarind Lane, Bombay, Standard Stores Supply Co., 212, Darmahatta Street, Calcutta and Birmingham Stores & Agency Co, 21, Canning Street, Calcutta. Various kinds of articles are now manufactured in India. Please explain clearly in which article you are interested. As regards workshop starting consult a mechanical engineer. Bixing is coating an article with brass while welding is joining two pieces of metals by mechanical process. Other terms referred to by you are used in mechanical engineering. For proper explanation of those terms consult an engineer. The following is a list of some advertising agents of India. Calcutta Advertising Agency, 15, College Square, Calcutta; Economic Advertising Agency, 158, Mukhtaram Babu

Street, Calcutta; B. Dattaram & Co., Grant Road, Bombay; Rao's Advertising Agency, P. O. Box No. 49, Madras and Jangra Commercial Agency, Ludhiana. There is perhaps no press cutting agency in India. Mill stores may be supplied by Jones Textiles Ltd., 3, Queen Street, Manchester, England.

1722. F. & Co., Alwar.—Hats, gowns, etc., may be supplied by American Woollen Products Co., New York, U. S. A.; Cleveland Worsted Mills Co., Cleveland, Ohio, U. S. A.; Pennsylvania Textile Co., New York, U. S. A.; Luckey John & Co., Ltd., 33, Tottenham Street, London S. W. 1; Sieff & Co., Ltd., 15, Aldersgate Street, London, E. C. 1 and Sterman Abraham, 130, Hounds Ditch, London, E. 1.

1723. R. S. J., Multan.—Photographic goods may be supplied by Calcutta Camera House, 158, Dharamtola Street and Photographic Stores & Agency Co., 151, Dharamtola Street, both of Calcutta. For books on photography write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

1725. G. B. M., Karvan.—Process of preparing a hectograph or duplicator appeared in August 1925 issue. Cyclostyle paper cannot be manufactured in India.

1726. K. I., Madras.—There are various kinds of confectioneries used all over India. Hence it will be advisable for you to go through a manual on confectionery to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1729. B. S., Jalandhar.—For starting business with a small capital go through New Idea and Small Trade and Recipes columns of **Industry**.

1730. K. C., Bannu.—An article on waste material utilization appeared in 11th volume of **Industry**. Capsules are manufactured in a machine used for the purpose. For the machine you may write to The Liverpool Press & Tool Co., Bridge Water Street, Liverpool, England.

1731. J. I. W., Tithahali.—Multiple hasker may be bought of C. S. Sircar, 86/A, Narkeldanga North Road, Calcutta.

1732. G. R. N., Salem.—Tin boxes required may be supplied by F. Tacklam, Peterstrasse

33 a, Hamburg, Germany and Kleinlein & Cie, Fichtestrasse 30, Leipzig, Germany. It will be advisable for you to secure tin boxes locally. Tin boxes of required description may be bought of Calcutta Tin Printing Works, P. O. Box No. 6772, Calcutta. Bottles and corks may be had of S. K. Dey & Sons, 124, Shova Bazar Street, Calcutta, and P. S. Qutt & Bros., 8, Ezra Street, Calcutta. Corks are manufactured by A. W. Burt & Sons, 23, Wapping High Street, London, E. 1, Dutton Leonard & Sons, 110 & 112, Hackney Road, London, E. 2, G. Lombard & Co., Ltd., 2, Church Street, Minories, London, E. J. Armstrong Cork Co., Pittsburgh, Pennsylvania, U. S. A.; International Cork Co., Brooklyn, New York, U. S. A.; Paddock Cork Co., Brooklyn, New York, U. S. A. and K. Nagayamagi & Co., 35, Hinamatsue-cho, Nihonbashi-ku, Tokyo, Japan. Glass bottles may be supplied by United Glass Bottle Manufacturers Ltd., 40/43, Norfolk Strand, London W. C. 2; Bellare Bottle Co., Bellare, Ohio, U. S. A.; Illinois Glass Co., Alton Illinois, U. S. A.; North Wheeling Glass Bottle Co., Wheeling, West Virginia, U. S. A.; Kasi Brothers & Co., 2, Sappomiyu-cho, Koben, Japan and Mizuochi and Co., 75 Nichome, Kita Kynhan-machi, Higashi-ku Tokyo, Japan.

1733. V. M. B., Ahmedabad.—Indian Printer, Post Box No. 2152, Calcutta and German Printer, Berlin, S. W. 61, Germany, deal with printing industry. As regards roller composition consult an expert. Try to be an apprentice in a printing press. Types, printing machines etc. may be had of K. Banerjee, P. O. Box No. 532, and Ashutosh Addy & Co., 16, Lower Chitpur Road, both of Calcutta.

1734. C. P. A. M., Coimbatore.—For industrial and technical books enquire of Chakraverty Chatterjee & Co., Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East, both of Calcutta.

1736. D. J. S., Colombo.—Process of preparing chalk crayons appeared in February 1924 issue. Musical instruments may be bought of Dwarkin & Sons, Dalhousie Square and The Continental Import & Co., Norton Bldgs, Lall Bazar; both of Calcutta.

NOTICES & REVIEWS.

A Panacea.

"Salvotine" is the name of a panacea for pains, piles, cuts, burns and similar other maladies prepared by Messrs P Adinarayan and Sons, Bimlipatam.

Locketts.

The latest design of lockets made by Messrs A R Qureshi, Ahmed Lodge, Gujrat, is extremely attractive. These lockets can be effectively used for advertising purposes.

Powder Packets.

We have received from Messrs T Ponniah & Co, Vadakangulam, Tanjore Dist., sample packets of "Takit" and "Drinkit". The former is a washing powder for cleansing clothes while the latter is simply milk powder.

Beautiful Necklaces.

We are informed that Messrs D B Sebraweek & Co, Chawri Bazar, Delhi, hold a large and assorted stock of beautiful necklaces of glass, bead and stone strung on rolled gold chains.

An Industrial Booklet.

The Art of Safety Match Making by Mr M Pashayappan, Shevapet, Sakin. Pp 32 (In Tamil).

This Tamil booklet is a practical guide for starting match industry on a small scale. It describes the manufacture of Safety Matches in full detail.

A Money Making Book.

Thirteen Ways to Make Money Compiled by S Nath Kapur and Prof P N Dilwanji, Distributors, The Mail Order Book Depot, Amritsar.

A number of practical recipes have been compiled in this booklet. With its help articles may be made for profit.

A Medical Journal.

Messrs R. Mediratta & Co, Gawalmundi, Lahore, have sent us for review a copy of *Ars Medici*—a medical journal published from Vienna. This official organ of the Austro-American Institute is devoted to all advances made in the leading clinics especially of Austria and Germany.

A Philosophical Tract.

Ten Poems of Vedant By Mr Sitaram, Kandhla, Muzaffernagar.

The high spiritual note which rings through all the poems incorporated in this little tract will certainly ennoble the mind of the reader.

Technical Education.

Sound vocational education is being imparted to the students of Shree Jain Vidyarthi Ashram, Vada Chauta, Surat.

A Patent Medicine.

"Digestina" is the name of a cheap medicine for dyspepsia prepared from indigenous herbs. It may be had of Dr A K Choudhury, 39, Bose para Lane, Baghbazar, Calcutta.

Commercial and Industrial India

Published from The Edinburg Press, 300 Bowbazar, Street, Calcutta. Annual subscription Rs. 10/-.

A perusal of the inaugural issue of the magazine under review will convince any one that it is a publication of the first water. It is devoted to agriculture, science, engineering and kindred subjects. Indeed all topics relating to commerce and industry have been touched upon though on the theoretical side. Thought provoking articles and forceful comments with which the journal is replete prove that it is ably conducted. It will serve its purpose if it helps to stimulate business activities.

An Useful Institution.

The India School of Accountancy, Post Box No 2020, Calcutta.

With the progress of industry and trade in India there will be an increasing demand for accountants. The above school is the pioneer of its kind in this country and is satisfactorily training up students in accountancy. This is a subject in which young men in search of a career may qualify themselves and no other institution offers better coach. The latest issue of their prospectus furnishes in details the prospects of employment, methods of tuition and other information.

An Exhibition.

The "Swadeshi Bazar and Industrial Exhibition" is held in Poona City every year by the middle of Autumn. Samples of raw materials and manufactured products of all kinds may be exhibited with advantage. For further particulars application may be made to the Secretary.

Modern Salesmanship.

Modern salesmanship which connotes the art and science of selling, has been exhaustively treated in sixteen big volumes published by the National Salesmanship Training Association of Chicago. From a perusal of the descriptive booklet we are convinced that this voluminous work is unique in many respects. The index shows a wide range of subjects covering all conceivable lines dealt with by experienced specialists. The Association also offers lecture courses by capable experts for the convenience of students seeking tuition by correspondence.

India has need of qualified salesmen, and young Indians on the threshold of life would do well to avail themselves of the service hereby offered. Our readers will receive all particulars from Mr S H Koroshi, Chandni Chowk, Delhi.

TRADE ENQUIRIES.

[To communicate with any party write him direct with name and address as given below, mentioning **Industry**.]

1534 S C Nath, B A, 50 Sita Ram Ghose Street, Calcutta—Wants a capitalist partner with Rs. 400 for a running lucrative threadball making business.

1601 T B Pradhan, Samising, Matelli, Jalpaiguri—Wants to be put in touch with manufacturers of paper lanterns and other fancy goods.

1689 M K Dave, C/o Singer Sewing Machine Co, Rajkot, Kathiawar—Wants to be put in touch with dealers in cut rags.

1798 Hira Singh, Divisional Supt of Agriculture, U P—Wants to be put in touch with the agent in Calcutta or Bombay for Fouldin's Eucalyptus oil.

1800 G P Muna Khan, Post Box 46, Bombay—An England returned young man having some knowledge in economics wants to work as an agent for Bombay.

1827 B B Mojumdar, Kohora Busty, Kaziranga Post, Sibsagar—Can supply Kapok cotton and raw lac in very large quantities.

1932 Mela Ram Dutta, Railway Road, Sialkot City—Wants to be introduced to suppliers of squirrel skins.

1945 Ratilal Bhikhabhai, Girgaon Post, Bombay—Desires to be put in touch with silk weavers and merchants of Man Junction in Benares Dist.

1959. B. L. Jayaswal, Town Hall, Bareilly City.—Wants to be put in touch with the purchasers of sabai grass, henip, munj, sirki, and chara and ganderpula.

1964. Narayen & Co, Gorakhpur, U P.—Can supply sal-wood charcoal in very large quantities.

1994 M V. Sambandam, 14, Irullapan Street, Madras—Wishes to be put in touch with suppliers of lizard skin, crocodile, skin, python and other snake skins.

2003 D H Sherdiwala, C/o Juggi Lal Kamlapat, Karwi, U P—Wants to be put in touch with dealers in semar and madar cottons.

2010 S B Bilmoria, C/o The Hygienic Dairy Co, Ahmedabad—Wants to be put in touch with suppliers of fresh fruits and vegetables.

2052 S Goyal & Co, Kiraohi, Agra—Can supply feather of all birds.

OCTOBER ISSUE OF INDUSTRY.

(In the Press.)

The October issue of **Industry** which will appear on the last day of the month will contain among others articles on Gold Lace Making, Fruit Essences, etc., in addition to the regular features such as India's Industrial Progress, Scientific Topics, Small Trades, Formulas and Recipes and Brief Queries and Replies, etc. Any friend of our subscribers may get a copy free as sample on application to the Manager, **Industry**, Shambazar, Calcutta.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows:—

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BUSINESS NOTICE.

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V P P. For particulars and Advt. rate please write

Manager **INDUSTRY OFFICE**,
Shambazar, Calcutta.

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AND ITS PREPARATION

The delicacies of Indian Preparations for Hukkah the varieties of Khambira, the mixing of the "smokers," of delightful essences, and other ingredients had hitherto been a trade secret. These have been thoroughly exposed in plain simple English in this new book -- the subject by an expert who knows business for nearly half a century.

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lessness, burning of the soles of the hands and the feet, premature grey hair, falling out of the hair, baldness, corns, dandruff &c. Its regular use makes the memory sharp and keen and the mind cool and content.

A phial of Essential oil is also given along with each tin of Kashmir Kusum. Each Golden decoated Tin Re 1

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INDUSTRY OFFICE:—Keshub Bhaban, Shambazar, Calcutta.

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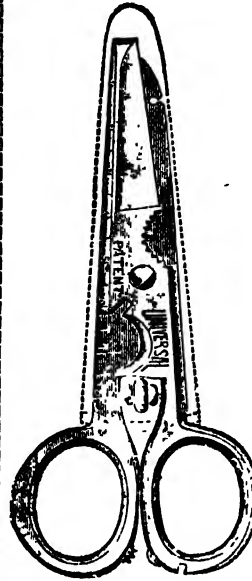
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**KESHAB BHABAN,
SHAMBAZAR, CALCUTTA.**



VOL. XVII.

CALCUTTA, OCTOBER, 1926.

NO. 199.

THE WEALTH OF IDEAS.

HOW often have you said to yourself "Why didn't I think of that before?" Perhaps it is some solution to a factory difficulty that has been bothering you for years—perhaps it is some improvement in your goods—or the selling of them. You had the thing more or less in your mind, turning it over and thinking round it and then suddenly like a flash,—comes an idea.

How many good business ideas have you overlooked or forgotten during the past year—hundred-rupee ideas, thousand-rupee ideas, million-rupee ideas? You never make a rupee without a rupee-idea or a thousand rupees without a thousand-rupee idea. In other words ideas are the life of business—ideas are money. You take good care of your cash: you know where it is and draw upon it as you need it—but where is the fountain-head of your ideas?

For business success depends not so much upon the capital invested in a business, as upon the ideas invested in a business. Every business failure—regardless of the superficial reasons assigned—is fundamentally a failure of ideas.

And in these days of easy transportation and easy communication you must

meet not only local competition but the competition of the best business minds of the entire country—no matter where your place of business may be: some concern, a thousand miles away, may be your chief competitor.

You are safe if your ideas are better than your competitor's. If his are better than yours the result is only a question of time.

Many good ideas are developed within your organisation, but most of them must be brought in from the outside. No business man would claim for a moment that he and his associates were capable of producing ideas equal in number and value to the grand total of those developed in other organisations. And it is equally evident that if you are not getting the better ideas that others have developed, you are losing time and money on each one you have missed.

The world stands ready to enrich a person for doing one thing, if he does that one thing well. A man with one idea is just as conspicuous among men, to-day, in his field of labour as the tall man in the passing crowd. The fellow with one idea rarely fails to make his mark.

ENCAUSTIC TILES.

ENCAUSTIC tile is a variegated paving-tile, on which patterns have been formed in coloured clays on the ordinary buff-tile, and fired, which brings out the colours more vividly. The manufacture of encaustic tile may be described under two heads, viz., the plastic and the semi-dry or dust processes. The former is in every essential point the same as that used in medieval times, differing in the greater finish and perfection which modern appliances have effected, and probably also in the material of the moulds. It is not known of what those anciently used were made, but conjecture has suggested wood, fired clay, and stone. The great difficulty of the manufacture consists in the necessity for introducing into a single tile the variety of different coloured clays or bodies which together compose the design it being essential that they should not only be perfected by the same amount of heat in the process of firing, but that they should possess an equal contractile power during each stage of the manufacture. The tile is first impressed from a plaster of Paris mould, bearing the pattern in relief, and set in a brass frame upon which fits another frame, the dimensions and depth of which correspond with the size and thickness of the tile; the pattern is thus sunk in the clay to a depth of about one sixteenth of an inch, in the following manner. The workman first introduces into the mould what may be described as a sheet of refined clay of the desired colour for the ground of the pattern; upon this facing which forms a kind of veneer, is placed

a thicker mass of a coarser kind of clay, and the whole is then subjected to screw pressure, which consolidates the two kinds of clays, and at the same time perfectly impresses the pattern of the mould; the superfluous clay is then removed with a scraper, and a second veneering of fine clay, similar to that used for the face, is placed on the back; the tile being removed from the mould, the depressed parts of the design are filled with clay, of one or more colours, by pouring it in a slip or semi-liquid state. The tile is then set aside for twenty-four hours to stiffen, and when the slip inlay has become nearly of the same consistency as the tile itself the face is brought roughly to an even surface, by "spreading" the soft clay with a palette-knife. The tile is then further allowed to dry till it attains the stiffness of wax, when it is "finished" by scraping the face with a steel scraper until the inlaid pattern and ground are developed free from superfluous clay, and the edges are cut true to a square, when it is ready for the drying-stove. When the drying, which takes from six to ten days, is completed, the tiles are placed in fire-clay boxes, known as saggars containing from eight to ten each, which are then stacked, one upon another, in the kiln or oven. The process of firing occupies four days and nights, and has to be conducted with the greatest care, as not only the exact size and hardness of the tiles are dependent upon it, but also the perfection of the colours, with which object it is necessary to raise the heat very gradually and to secure a regular circulation of air in the oven, so as to produce

the exact degree of oxidation needed to bring out the desired colours in the materials used for this purpose. The pyrometers used in this part of the process consists of long narrow tiles, and the degree of heat is judged both by their colour and the gradual reduction in length which they undergo, each piece, as it is withdrawn from the oven, being measured in a gauge, with this object,—the total shrinkage of the tile, in the drying and firing, amounting to about 1½ inches in the foot. For purposes of paving most of the modern encaustic tiles are used in the bisque or unglazed state, the glaze in the ancient tiles having apparently been employed with the object of covering the soft material of the tile itself and of adding richness to the colour. Where glazing is found necessary in the modern tiles it is effected by dipping them in a combination of lead, alkaline salts, felspar, and silica, finely levigated in water, which is fused by passing them through a kiln specially constructed for the purpose.

The semi-dry or dust process of manufacturing encaustic tiles is an adaptation of an invention patented in the year 1840 by which articles of various kinds are moulded out of pulverized clay, in metal dies, by screw pressure. In the year 1863 another process was patented by which the use of powdered clay (hitherto only used for tiles of one colour) was applied to the manufacture of encaustic tiles. The design is formed by perforated brass plates,—from one to six or seven being used according to the nature of the pattern. Where the whole design can be perforated in the plate

without detaching such parts as would represent the ground, only one plate is needed; but where there are several concentric rings or similar forms, additional plates are required. Into the perforations of each plate metal rams, attached to a flat plate of iron, are accurately fitted. The metal die in which the tiles are pressed is composed of a thick block and a square frame or "box;" the latter is connected with levers and a balance weight, so that it can be raised or depressed, either forming a hollow mould, of which the face of the block above mentioned forms the bottom, or depressed in such a way as to leave the face of the block standing above it, in which latter position it is ready for the commencement of the process. The perforated plates first mentioned are then, in succession, placed upon the face of the block, being kept in position by two pins fixed to the frame of the die, corresponding with holes made in their margin. The perforations of the brass plate being filled with powdered clay of the desired colour, this is so far compressed, by means of the metal ram, as to allow both the ram and the plate to be removed together leaving the compressed dust (representing the pattern of the tile in relief) on the block or face plate. In cases where a number of plates are necessary, the pattern is thus built up, each adding such a part as can be perforated in a single plate. The frame is then raised, so as to form a mould of the required depth, which being filled with powdered clay, intended to form both the ground of the pattern and the substances of the tile, the whole mould or die is slid,

in a groove provided for the purpose, under the screw press, to which is attached a plate covering the mould, and resting on the top of the movable frame; this on pressure being applied, forces down the frame until the powdered clay is thoroughly consolidated and incorporated with that part forming the design. On the pressure being relieved, the die is drawn from beneath the press, the frame is forced down by means of the levers to which it is attached, and the tile is left resting face downward on the block, when it is ready for the drying stove, the subsequent treatment being the same as in the plastic process. This process affords the advantage of much greater rapidity in execution than can be effected by the plastic method, and as the tile undergoes little or no shrinkage in the desiccation of the small amount of moisture which is needed to make the particles of the dust combine under pressure, the risk of distortion in the process of drying is reduced to a minimum but the heavy prime cost of the perforated brass plates necessarily confines this otherwise valuable invention to such designs as are most largely in demand.

A sharpening steel which has become greasy should be soaked in turpentine, then in strong soda and water. The steel must be kept clean, or it will not act as a sharpener.

When ivory knife handles become discoloured they can be restored to their former whiteness by rubbing them with turpentine.

PHOTOGRAPHIC PLATES.

THE manufacture of photographic plates is described in the different stages of manipulation.

Thirty grains of gun cotton should be taken and placed in 18 fluid ounces of rectified sulphuric ether and then 2 ounces of alcohol should be added, making thus 1 pint of the solution. The cotton if properly made, will dissolve entirely; but any small fibre which may be floating about should be allowed to deposit, and the clear solution poured off.

Prepare a saturated solution of iodide of potassium in alcohol say 1 ounce, and add to it as much iodide of silver, recently precipitated and well washed as it will take up; this solution is to be added to the collodion, the quantity depending on the proportion of alcohol which has been used in the preparation of the collodion.

A plate of perfectly smooth glass, free from air-bubble or striae, should be cleaned very perfectly with a few drops of ammonia on cotton, and then wiped with a very clean cotton cloth.

The plate must be held by the left hand perfectly horizontal, and then with the right a sufficient quantity of iodised collodion should be poured into the centre, so as to diffuse itself equally over the surface. This should be done coolly and steadily, allowing it to flow to each corner in succession, taking care that the edges are well covered; then gently tilt the plate, so that the superfluous fluid may return to the bottle from the opposite corner to that by which the plate is held. At this moment the plate should be

brought into a vertical position, when the diagonal lines caused by the fluid running to the corner will fall one into the other, and give a clear flat surface. To do this neatly and effectually some little practice is necessary, as in most things; but the operator should by no means hurry the operation, but do it systematically, at the same time not being longer over it than is actually necessary, for collodion being an ethereal compound evaporates rapidly. Many operators waste their collodion by imagining it is necessary to perform this operation in great haste; but such is not the case, for an even coating can seldom be obtained if the fluid is poured on and off again too rapidly; it is better to do it steadily, and submit to a small loss from evaporation. If the collodion becomes too thick, thin it with the addition of a little fresh and good ether.

Previous to the last operation, it is necessary to have the bath ready, which is made as follows:—

- | | |
|----------------------|------------|
| Nitrate of silver | 30 grains. |
| Distilled water | 1 ounce. |
| Dissolve and filter. | |

The quantity of this fluid necessary to be made must depend upon the form of trough to be used, whether horizontal or vertical, and also upon the size of the plate. With the vertical trough a glass dipper is provided, upon which the plate rests, preventing the necessity of any handle or the fingers going into the liquid. If, however, the glass used is a little larger than required, this is not necessary. Having then obtained one

or other of these two, and filtered the liquid previously, the plate, free from any particle of dust, etc. is to be immersed steadily and without hesitation; for if a pause should be made in any part, a line is sure to be formed, which will print in a subsequent part of the process.

The plate being immersed in the solution must be kept there a sufficient time for the liquid to act freely upon the surface, particularly if a negative picture is to be obtained. As a general rule, it will take about two minutes, but this will vary with the temperature of the air at the time of operating, and the condition of the collodion. In cold weather, or indeed anything below 50 degree F, the bath should be placed in a warm situation, or a proper decomposition is not obtained under a very long time. Above 60 degree the plate will be certain to have obtained its maximum of sensibility by two minutes' immersion, but below this temperature it is better to give a little extra time.

To facilitate the action, let the temperature be what it may, the plate must be lifted out of the liquid two or three times, which also assists in getting rid of the ether from the surface, for unless this is thoroughly done a uniform coating cannot be obtained; but on no account should it be removed until the plate has been immersed about half a minute, as marks are apt to be produced if removed sooner.

The plate is now ready to receive its impression in the camera.

FRUIT ESSENCES.

(By a Practical Expert.)

It will appear from the following recipes fruit essences are easily made. Indeed the industry can be carried on by the ladies in their spare time. The utensils required are to be found in every household while the ingredients are simple.

By such simple processes fruits of one season will be made available in another when they may be enjoyed with double relish. The products are, however, not only dainty, but they improve the health and strengthen the body by aiding digestion.

ORANGE.

Take 6 oranges; wash them clean and wipe thoroughly dry. Take 30 ozs. rectified spirit in a jar. Immerse the oranges in it; close the mouth and leave for 20 days. Finally strain through filter paper.

BANANA.

Take 1 poa banana; peel and cut in twos. Put them in a wide mouthed bottle and pour 20 oz. spirit. Set aside for seven days and then filter through filter paper.

APPLE.

Select $1\frac{1}{2}$ poa good ripe apples. Peel and put intact in jars. Pour 24 oz. spirit over them; close the mouth. Strain through filter paper after sixteen days.

PEAR.

Take $\frac{1}{2}$ seer pears; peel and cut each into 8 pieces. Put them in a jar and pour 30 ounce spirit. Leave with closed mouth for 20 days. Finally filter and bottle.

MANGO.

Select good ripe mango fruits of the Bombay variety. Peel and stone, and cut into quarters. Put $\frac{3}{4}$ srs. of these slices into a jar and pour 24 oz. spirit. Leave for 12 days and strain through filter paper.

PEACH.

Choose 12 ripe peaches; and peel them. Put them in a wide mouthed bottle and pour 8 oz. spirit. Close the mouth and leave for 3 days. Filter and bottle.

ROSE-APPLE.

Select 30 good rose-apples and reject their green portions. Put the pieces into a wide mouthed jar and pour in 20 oz. spirit. Close the mouth and after 10 days filter and bottle.

ESSENCE OF LITCHEE.

Take 50 good ripe litchees of Muza-fferpore. Put them and soak in $\frac{1}{6}$ oz. spirit in a jar for 12 days. Finally filter and bottle.

ESSENCE OF JACKFRUIT.

Take 10 cells from a ripe jack fruit of the crisp type and reject the stones by cutting into halves. Macerate them in 26 oz. spirit in a jar for a fortnight. Strain through a filter paper and bottle.

GUAVA.

Select 8 good ripe (but tight) guavas of the Kashi variety and peel them. Put them intact in a jar and pour over them 16 oz. spirit. Close the mouth and leave for 20 days. Filter and bottle.

PINE-APPLE.

Take good ripe pine-apples. Cut into pieces and reject the cores and eyes. Put $\frac{1}{2}$ poa of these pieces into a wide mouthed bottle, and mix 8 oz. spirit. Close the mouth for 48 hours. Strain through filter paper and pack in bottle.

• **STAR-APPLE.** •

Select 25 big sized star apples and reject the stalks. Put them intact in a wide-mouthed bottle and pour 12 oz. spirit. Close the mouth well for 15 days and then filter.

• **LIME.**

Immerse 12 citrus limes of the Kagzi variety in 24 oz. spirit for a fortnight. Then filter and bottle.

• **OLIVES.**

Peel some olives and remove the skins. Take $\frac{1}{2}$ poa and put in a bottle. Mix 6 oz. spirit. Close the mouth. Set aside for a month. Finally filter and bottle.

• **ALMOND.**

Take one poa almond of Kabul variety. Remove the skins and cut into two. Put in a bottle and digest with 30 oz. spirit. Close the mouth and leave for one month. Then filter and bottle.

RAISINS.

Take $1\frac{1}{2}$ poa picked raisins; clean them and steep in 12 oz. spirit in a bottle. Close the mouth for seven days and then strain through filter paper.

MUSK MELON.

Select a good ripe but tight musk melon; peel the skin and remove the slimes. Cut into slices and take 1 poa. Put the pieces in a wide mouthed bottle. Pour in 16 oz. spirit; close the mouth and leave for 24 hours. Finally filter through filter paper and store in a bottle.

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GOLD LACE.

GOLD Lace is a kind of lace made of gold wire, flattened between two polished steel rollers, into a ribbon which is twisted round a cord of silk. The gold wire used in the manufacture of gold thread is nearly always composed of pure silver with a thin coating of gold in India. But in European Countries it is only the very best qualities of this wire which are made of unalloyed silver. A good quality of English gold thread is made from wire consisting of a part of copper added to 25 of silver, which is afterwards coated with gold. But alloys of copper and silver in many proportions are used, some wires containing only 1 part of silver to 60 of copper. The silver, or alloy of copper and silver, is made into a rod $1\frac{1}{2}$ inches in diameter, and then annealed and polished to prepare it for its coating of gold. This is laid on in the form of leaves of pure gold, and subjected, for the best qualities of wire to the fire-gilding process; that is, the gold coated rod is heated to redness on burning charcoal, which causes the leaf to adhere firmly. Rods so treated are next smeared with wax, and drawn through the holes of a steel draw-plate. The wire is frequently annealed during the process of drawing, and this requires to be very skilfully done, or the golden tint of the surface is lost. Gold wire for thread is generally drawn down to a size measuring 1000 to 1400 yards to the ounce of metal. Finer sizes reach the length of 1800 to 2000 yards to the ounce, and to attain this fineness the wire is drawn through perforated gems, such as diamonds or rubies. The fine wire, after

being annealed, is flattened between polished steel rollers.

Finally the flat wire, or rather ribbon, is wound over yellow or orange coloured silk, so as completely to envelop it, by a spinning engine. The gold thread is then finished. Some of the best qualities of the metal covering or plate of this thread have 12 penny-weight of gold to the pound of silver or of alloy. Inferior kinds have as little as 2 penny-weights to the pound, and still cheaper sorts of thread are covered with flattened copper wire which has received a thin coating of electro-deposited silver, and this afterward receives, on the outside of the thread only, a still thinner electro-deposited coating of gold—two grains of the precious metal covering 3000 square inches of surface. For this very cheap kind of thread yellow cotton is used instead of silk.

The only difference between gold and silver thread is that the thin coating of gold is wanting on the latter. Gold thread is used in the manufacture of military lace. This however, is a woven substance and not true lace, but some real lace is made both of gold and silver thread. Both kinds of thread are also used for facings of liveries, and for ecclesiastical robes, altar cloth and banners. These and other fabrics are either embroidered or woven, but often only in part, with the thread. Much of the gold thread used for theatrical dresses and decorations has only a covering of Dutch metal and the silver thread in these is spun with a covering of a cheap white alloy, having a mere film of silver on the surface.

MANGO 'PARCHMENT.'

There are infinite varieties of mangoes; some cultivated, others wild. This article deals with a method of preserving fibrous mangoes in the form of parchment—like sheets. This method is very widely used in Malabar.

This method can be employed in the case of certain wild mangoes which as fruits are not widely relished.

The mangoes are collected when ripe and cleaned well in water. The irritating fluid present in the stalk is pressed out as completely as possible. A clean plank or a piece of mat prepared of aloe leaves or bamboos is taken and thoroughly cleaned and dried. The mangoes are then peeled. The stone together with the edible mesocarp is pressed hard in the hand and the juice falling down is distributed evenly by moving the hand to and fro over the plank or mat. When all the mangoes are thus pressed the plank or mat is kept in the sun to dry. More juice is added every day, the amount depending upon the number of mangoes available each time. Each addition is done over the previous one.

The juice is completely dry in some six or seven days, and the sheet is rolled off the plank or mat from one end. It is then cut up into smaller rolls and preserved or sold. Some keep the small rolls in sugar but it is not common, the general practice being to keep the rolls as they are, in jars closed airtight.

This is not at all done on a commercial scale anywhere. At present the preparation may not be considered very sanitary. But by a little modification we can make it a thoroughly sanitary one; for instance by making use of a suitable squeezer and drying the stuff altogether in steam. Drying in open air with additions of fresh juice every day may cause fungus growth or infections by flies.

The sheet is very agreeable to the taste, and so it is a very desirable process if conducted on sanitary lines.

—THE POONA AGRICULTURAL COLLEGE MAGAZINE.

FEEDING FARM ANIMALS.

THE chief purpose in feeding farm animals is to produce meat, milk, eggs, wool, etc., or energy in the form of work. Animals in a wild state eat enough to keep themselves alive and maintain their condition. Man has interfered, however, for the purpose of securing greater production. One of the weighty considerations which governed breeding experiments with domesticated animals is the idea of producing breeds which can continue large amounts of feeds and make good use of it.

The chief problems before the practical stock grower are what feeds are most effective in animal production, in what amounts should they be fed for greatest profit, what combinations of feeds are most effective, and what effect have the various feeding stuffs on the quality of the meat, fat, milk, etc. The economy of production of the various grains and coarse fodders will determine in almost every instance the ration adopted for a given purpose.

Animals are much influenced by the quality and palatability of the feed. The feed stuffs should be clean and should be prepared in an appetizing manner. Attention to these little details may prevent the animals from getting off feed. In order to avoid loss of appetite and consequent checks in the process of fattening, changes in the grains and coarse fodders of the ration should be made from time to time. In such changes substitutions should be made according to the relative feeding value of the different materials.

The ration must be adopted to the species of animal. It has been found by practical experience that certain feeding stuffs are injurious to certain kinds of domestic animals.

The vegetable materials used in feeding farm animals may be conveniently divided into two classes, (1) coarse fodders, including forage plants and roots, and (2) concentrates or grains, seed and the various bye-products resulting from their commercial use.

The chief forage plants belong to the families of grasses and legumes. The grass family is represented by corn, cereals and common grasses, while the legumes include clover, alfalfa, peas, vetches, etc. As feeding stuffs the legumes differ from the grasses chiefly in the greater amount of protein which they contain. Coarse fodders as a class are distinguished from the grains by a smaller percentage of protein and carbohydrates and a larger percentage of crude fibre. Practically all of the forage plants may be fed green, dry or in the form of silage. The practice of feeding forage plants in a green state is known as "soiling." The relative advantages of feeding fodders green, dry and ensiled will be discussed briefly. As a rule forage plants are most palatable in the green state, and sometimes more digestible. Drying forage plants in the sun under favourable conditions does not affect their feeding value appreciably except in the case of corn, sorghum or other plants with thick, succulent stems which cannot be dried quickly. In such plants a certain and consequent loss in feeding value is unavoidable. Forage plants are

tougher and less palatable when dry than when green. Moreover, if cured under unfavourable conditions (such as rain and cloudiness) they become mouldy and seriously damaged. Imperfectly cured hay may suffer loss in feeding value from heating in the mow or stack.

As a rule hay and silage can be fed together to the best advantage. The stage of growth at which forage crops are cut will influence the amount, composition and palatability of the crop. With the exception of legumes forage plants give the largest yield when cut at full maturity. The percentage of protein, however, decreases as the crop matures, so that probably the best returns in quantity and quality are obtained if clovers and grasses are cut in full bloom; legumes for forage should always be cut before becoming fully mature.

Forage crops when ensiled undergo important changes in composition, due to complex processes of fermentation. The loss of food value in this way vary from 2 per cent to 40 per cent, but under favourable conditions should not exceed 4 to 8 per cent. The loss in ensiling is not greater than that in field curing. In fact the results of experiments are slightly in favour of silage, as being the more economical way of preserving fodder.

Roots of various kinds are extensively fed to farm animals. The more important are turnip, rutabaga, field beet, sugar beet, mangelwurzel, carrot, potato and cassava. Roots contain a relatively large amount of water. Their chief advantage is that they furnish a

large amount of appetizing, succulent food which keeps fresh for a long time. They are easily preserved by keeping at a low temperature with good ventilation. If fed in proper proportions roots may be substituted for soiling crops, hay or silage. Roots may be fed raw, cooked or ensiled. There is little, if any, advantage in ensiling roots and most authorities advise against the practice. As a rule feeding stuffs are made less digestible by cooking some roots, especially potatoes, may be rendered more palatable by cooking.

Grains and seeds contain relatively little water and large amounts of protein, starch and oil. The chief grain feeds are corn, barley, oats, wheat, rye, rice, kafir corn, millet, buck wheat, cotton seed, flax seed and the different kinds of beans and peas. Peas, beans and oats are rich in protein, corn is especially rich in starch, while cotton seed and flax seed have a high oil content. Experiments indicate that there is no advantage in cooking grains. The digestibility of grains is increased by grinding and there is less waste of grain in the manure. If a mill is near at hand and the miller's toll is not high, it may pay to grind grain.

Cracks in furniture should be filled in with beeswax. Soften the beeswax until it becomes like putty, then press it firmly into the cracks and smooth the surface over with a thin knife. Sand paper the surrounding wood, and work some of the dust into the beeswax.

Jugs or basins in which milk is kept should be well scoured with salt at least once a week.

LEATHER TANNING.

THE skins or hides of animals, being organic matter and of similar nature to flesh, will decompose and putrefy when left in the moist state. When the skins are dried, they become very hard and horny, which features are objectionable for many reasons, let alone rendering them unfit for use except for certain unimportant purposes. The main reason for tanning hides and skins and converting them into leather is to prevent them from spoiling and perishing so quickly, but at the same time render them soft and flexible enough to be usable in various ways.

The nature of the tanning process varies greatly and the variation therein allows the manufacture of such diversified leathers as sole leather, light kid, etc. But it must not be thought that the tanning operation is the only factor which controls the properties of the finished product. The finish that is given to the leather also determines the character. Thus patent leather, suede leather, enamel leather, glove leather, etc., depend on the after-treatment as much as on the tanning process.

The skin or hide is composed of two layers. The top layer is known as the epidermis or cuticle, and the bottom layer as derma, also called the true skin. In making leather the epidermis is completely removed before the actual tanning operation is reached. Hence leather is made from the true skin only, which is composed principally of fibrous material.

After the hair has been removed from the hide as well as any flesh that may adhere to it, and it is properly softened up, the hide is allowed to remain in a vat containing tannin materials. Vegetable tannins are used for this purpose, and they comprise such materials as hemlock bark, chestnut extract, quebracho, mangrove, bark, and others. All contain

tannic acid, and this is the active principle which combines with the organic matter of the hide to convert it into the substance we know as leather. The vegetable tanning process gives sole leathers, leathers for uppers, harness leather and the like. The main disadvantage with the process is the time taken in its completion.

Chrome tanning is a comparatively new process and is chemical in nature. A chemical is employed in the process. It is much more rapid than the vegetable tanning method, and it gives a leather which is more resistant to water than the ordinary bark-tanned leather. In this case the chemical combines with the putrescible matter in the hides and converts it into a non-decomposable form.

Leather is also tanned by means of the common substance alum. This method is used for making white glove leather, white kid and the like. Another method of tanning, which by the way is the earliest tanning method known uses the oil, fat and brains of animals. These substances become thoroughly impregnated with the skin and preserve it from decomposing. The process is employed for manufacture of chamois, buff and buck leather.

Recently, an interesting development in the tanning process has taken place with respect to the shortening of the time it takes to tan the leather. This has been done by invoking the aid of electricity. The electric current is used, to cause the tan liquors better and more rapidly to penetrate into the hide structure. A current is passed through the tan bath while the hide is immersed in it, and the electric action of electricity on the tannin solution permits the latter to work its way into the fine capillary passages of the hide much more quickly and more effectively than when the hides are simply soaked in the tanning bath as heretofore.

MATCH INDUSTRY IN INDIA.

IN 1924 it was announced that the Swedish people intended opening factories in India. To-day we see a factory already working in full swing at Ambarnath and another recently opened in Assam, which is also under Swedish control. During the next five years we must prepare ourselves to see more than half a dozen such factories in different parts of India controlled by the Swedish people. It is therefore clear that these foreigners have found in India a paying fountain, as they have come down such a distance for their business activities. For a few years India has withstood the annual drain of about four crores of rupees in one branch of industry, how long it will continue to do so and with what results is a question best left unanswered.

The Swedish people cleverly manage their business affairs. One will be surprised to find the extensive information regarding business in their offices. The owners of our Indian factories will receive a nasty shock if they are told that the Swedish know more about the Indian factories than they themselves know about them. It is clear that the Swedish people are taking no chances and their future plans seem to be thoroughly cut and dried. They are out to monopolize the match industry in India and no wonder if their methods are a bit unusual.

There are capitalists in India, whose verbal sympathy for their nation is unsurpassable, but it is very regrettable to note that their interests are not as yet interwoven with those of their country. So far India has suffered much owing to the indifference of these capitalists and this same indifference is very much responsible for the present poor state of the country. Very few of these big folks realise, what agonies they are directly or indirectly inflicting on the middle classes in India. Starvation,

insufficient clothing and heavy death-roll are among the killing agonies of abject poverty consequent on unemployment. And every day the cry of unemployment is increasing, while the capitalists of India are watching this appalling condition quietly, allowing foreigners to take away fabulous amounts annually from every industry that could have been easily turned into a national one only if these moneyed men had cared a little to look into its possibilities.

It will be admitted that the development of the match industry in India will mitigate the sufferings of these poor classes to some extent. The prospects of this industry in our country are quite safe. Nevertheless it must be borne in mind that the Swedish people who have taken so much pain to establish factories in India will leave no stone unturned to crush all competitions.

The vast forest resources in our country will make it possible for our people to treat this as a paying indigenous industry. If some of the leading capitalists in India make it a point to form a powerful syndicate and establish factories in different parts of India, it will not be very difficult to force our rivals to retire or seek new pastures. But it must be done quickly, at least before the best of sites are taken up by our rivals. To demand further protection from the Government can be decided later on, but it is quite necessary that side by side with the Syndicate, an association of Indian Match Manufacturers should be formed, with hardworking and active secretaries to carry out a conjoint propaganda work and regulate business methods so as to kill foreign competition. The capital required can be easily raised with the help of influential men, especially now that there are no doubts about the paying possibilities of this industry.

—By MR. B. P. PATEL,

IDEAS FOR SMALL CAPITALISTS.

Egg Preserving.

Mr. Lal Singh of Messrs. D. Sant Singh & Sons, Essences Manufacturers, Asrapur, Attari, Dist., Amritsar sends us the following:—

A person residing in an Indian village can do much more than those living in cities. The idea I wish to lay before the readers of INDUSTRY is this:— That a person having in his pocket Rs. 500/- can start a good industry in villages namely "Egg Preserving" and can earn a decent livelihood thereby. In summer a villager can collect new laid eggs from the neighbouring villages at very cheap rates and can preserve them in a solution of a certain chemical known as Water Glass. 1 lb. of this chemical mixed with a gallon of boiling water can preserve more than 100 eggs for 12 months. The direction is given below.

Besides eggs a villager can keep a number of hens and cocks very easily and at a very low expenditure. He can preserve the eggs which they lay during the summer season; indeed he ought to go on preserving each of the eggs and in the winter season, when the eggs are in demand and found very scarcely, he can sell at a good profit. In the same season he can make a good profit on the fowls which he keeps during the summer season selling them in town and in big market places, where the sale of such things are sure and certain, at reasonable prices.

ESTIMATE.

The following is the detail of expenses etc:—

16 lb. water glass preserving eggs	Rs. 8/-
20,000 eggs if bought @ 1 pice each or more	300/-

Cost of 100 fowls @

Re. 1/- each 100/-.

Reserve for unforeseen expenses etc.

92/-.

Total Rs. 500/-.

In Kashmir the eggs are very cheap in summer; one can get 5 eggs for one pice.

After the summer the demand of eggs and fowls increases, as well as the prices. The following is the estimate of profit.

If 20,000 are dis-

posed off @

-1/-9 each. Rs 900 0 0

If 20,000 are dis-

posed off @

-1/-9 each.

Rs. 900 0 0

If 100 fowls are

sold @ 1|8/-

each.

Rs 150 0 0

If 100 fowls are

sold @ 1|4/-

each.

Rs. 125 0 0

Total Rs. 1050 0 0 725 0 0

Profit Either 550 0 0 or 225 0 0

The profit is undoubtedly a big one; but in the beginning, he will experience a little difficulty as it is natural in every business but as he gains experience and advertises his work he will find pleasure.

I remember a man in Amritsar Dist, two years ago, when I saw him, he was simply starving and begging winter season, but now a year ago he had adopted the above business. Last time I met him, he was not only progressing very successfully but was really well off.

Small Trades & Receipes.

Negative Varnishes.

Shellac	3½ oz.
Sandarac	¾ oz.
Mastic	40 gr.
Castor oil	1 dr.
Rectified Spirit (.920 to .950)	30 fl. oz
Dissolve, and filter.	

Photographic Developer.

Metol and Hydroquinone Developer.

I Pure hot water	80 oz.
Metol	1
Hydroquinone	
Sulphite Soda Crystals	

II Pure water	80
Carbonate Soda	
Crystals	
To develop, take of	
Pure water	oz.
Solution No. I.	
Solution No. II.	

Moustache Fixer.

Spermaceti	5 Parts.
Wax	20 "
Water	50 "
Gum Arabic	15 "
Soap	10 "
Glycerine	5 "

The soap is finely shaved, and the gum arabic pulverized; both are then stirred up with 20 parts of water to a homogeneous paste. The spermaceti and wax are heated with the remainder of the water, on a water bath, and stirred carefully into the gum and soap paste. Lastly, the glycerine is added, drop by

drop. Perfumery and colour may be added to suit the taste.

A General Febrifuge.

Carbonate of Ammonia	2 dr.
Alum	1 dr.
Capsicum	½ dr.
Foreign Gentian	½ dr.
Colombo root	½ dr.
Prussiate of iron	½ dr.

The solid ingredients to be pulverised; mix by putting into a bottle, and adding 4 ounces of cold water.

Dose—1 teaspoonful to a grown person, every 2 hours, in common cases of fever. It may be sweetened, if preferred. Shake well each time before taking and keep the bottle tightly corked.

Vanishing Cream.

Stearic acid, 200 gms., oleic acid 40 gms; potassium hydroxide, 10 gms, water, 800 c. c. The fatty acids are melted together and the hot solution of alkali poured in while the whole is briskly stirred and the heat maintained. The agitation is continued while cooling, and until a creamy product results. The perfume is then added.

Lime Juice and Glycerine.

Potassium Carbonate	2 dr.
Almond Oil	2 oz.
Lemon Oil	2 dr.
Glycerine	1 oz.
Lime Water	8 oz.

Take and mix them thoroughly.

INDIA'S INDUSTRIAL PROGRESS.

Hand Weaving in Broach.

It is reported that the hand-weaving industry still exists on a large scale in Broach and that the Government of Bombay decided recently to improve the economic condition of the weaving class by introducing new methods of hand-weaving on modern lines. As a result of their efforts, the economic condition of the weavers, who are known as *khatris*, has decidedly improved and new weaving machinery has been installed in the locality. The attention of the *tai* weavers, who are Mahomedans, has been drawn to these improvements and those pioneers of the *tais*, who have also installed new machinery will probably be followed by the entire community in short space of time. With the advent of new methods, the community of *khatris* which was disturbed by petty discords, has come closer together.

In Broach, there are altogether about 400 families of weavers of all communities. A school has been opened by the department to impart free education as regards weaving on modern lines.

Mineral Industry of Punjab.

The Punjab mining industry is relatively unimportant. During recent years it has, however, received a great impetus from two sources; firstly, the discovery of mineral oil in large quantities in the Attock district, and secondly, the introduction of Punjab coal in the local markets of the province. Oil spring had been known for many years to exist in the Rawalpindi and other districts in

the Punjab, but the output was insignificant until the discovery of the Khaur field which still remains the only place where oil has been struck. The coal output of the Punjab is insignificant compared with the total Indian output but the possibilities of development seem greater when once adequate communications are provided. The salt industry is more important.

Boot and Shoe School for Bengal.

With a view to find a new avenue of employment for the unemployed Bengali Bhadrak class the desirability of starting a boot and shoe making department in the Calcutta Research Tannery was under consideration of the Department of Industries. At present at a modest estimate, about 50,000 pairs of boots and shoes of modern type are made every month in Calcutta by hand labour. At least 90 per cent of them are made under Chinese control and management. From this it may be assumed that the Chinese have practically captured the shoe making industry, while the Punjabis are largely interested in the local retail leather trade. The reason why the Chinese have been able to capture the industry is that they know the practical side of work thoroughly. Schools in shoe-making have been started at Cawnpore and in Bihar and Orissa which are doing useful work. A scheme has been prepared for Bengal to train 12 students—8 from educated young men of Bhadrak class and 4 from *muchis*—recruitment to be made every two years.

SCIENTIFIC AND TECHNICAL TOPICS.

Inorganic Chemicals Initiate Life.

The feat of making lifeless chemicals act as though they were alive has been recently accomplished by a French chemist. A few drops of a solution of 14 parts of caustic and one of rhodamine in a mixture consisting of one part of olive oil and two of gasoline exhibited life acts. The drops staged a close imitation of the behaviour of ameabae, one of the simplest of animal organisms. They divided, moved about slowly, elongated, formed vacuoles within themselves and constantly changed shape. Under proper conditions, the display could be kept up to as long as an hour. This remarkable phenomenon is not due to diffusion currents, changes in osmotic pressure, surface tension, etc.

The Cause of Grey Hair.

The condition of the hair is largely controlled by the health, so if one begins to go grey early in life the best thing to do is to consult a doctor as to the state of one's general health. There are several reasons for premature greyness and few cases are hopeless. With careful treatment and a certain amount of patience the hair may be restored to its rightful colour.

The chief cause of premature greyness are nerve strain, severe mental shock, or the use of injurious shampoos. Too much lime in the system is another cause; people who suffer from gout or

rheumatism are often grey early in life. Very occasionally premature greyness is hereditary and in such cases little if anything can be done to remedy the trouble. Women who have a history of premature greyness in their family should pay special attention to diet. Plenty of good, nourishing foods should be taken and, occasionally, a codliver oil or strengthening emulsion. Rich, greasy foods and too much tea-drinking should be strictly avoided; both are bad for the digestion and so are injurious to the hair.

Aluminium Wallpaper.

Swiss wallpaper manufacturers are reported to have successfully developed a process of wallpaper. As manufactured at present, the paper is made of commercially pure aluminium, rolled and backed upon stiff paper. The design is then stamped upon the aluminium surface, the impression of the stamping, colouring and embossing processes are said to give satisfactory results, but so far the manufacturers have been unable to overcome a gaudy, metallic effect in the finished paper.

Harnessed Lightning.

Few people have a clear idea of the principles governing the use of lightning conductors. An ordinary piece of wire used as a conductor would be less useful in a severe thunderstorm than a single waterpipe on a house would be in coping

with a waterspout. Nearly all lightning strokes are characterized by numerous side flashes, and these have to be provided for.

All the metal work on a building is inter-connected. The lightning conductor on the chimney or turret is joined perhaps to the rain-water pipes, these in turn being linked up with the iron railings round the building, and so on. In this way the flashes thrown off by lightning strokes are collected and guided safely to earth.

Many people imagine that the end of a conductor is simply buried a few feet in the ground and left to take care of itself. If this were done the soil would soon be burned up, leaving the conductor almost useless. In ground that is permanently moist large copper plates are buried and the connections made to these. In dry soil a tube filled with charcoal is used.

Gold Locating Apparatus.

Owing to the invention of a wonderful gold-finding instrument, which was used in the recent Larentic operations, there is now every possibility of recovering the huge quantities of bullion lying in various parts of the ocean's bed.

The gold-finder is just a rod four feet in length, just like a broomstick. The end is tipped with metal, and there is a metal wedge bound three parts up the handle. To the handle is fixed a length of wire and a galvanometer.

The gold-finder was first tested during the Laarentic operations on the deck of the salvage vessel Racer. A larger bath was placed upon the deck and gold

rings, sovereigns, silver, copper and articles made of aluminium, were thrown in.

The inventor of the gold-finder, first placed the spear near the gold and immediately the pointer of the galvanometer swung to the left. He then took the spear away and the needle returned to zero—the centre of the face of the galvanometer. When he next placed the spear point near the other metal, the pointer went over to the right.

Flowers as Food.

To suggest that we should add flowers to our daily menu would to many people seem like foolishness. But a famous French food authority expresses surprise that we do not make more use of flowers in this way. He reminds us that Europeans eat cauliflowers, artichokes and brussels sprouts, all of which come under this heading.

In China flowers often figure on the table as part of a meal. One of the national dishes is a soup made of the day lily, over 4000 tons of the bloom being used for this purpose every year.

A chrysanthemum salad is one of Japan's most highly favoured dishes. The flowers are carefully washed and served in the way as lettuce or watercress is served.

In some Eastern countries the petals of the yellow water-lily are used as frequently for dessert as apples and oranges in England.

In Bengal the 'barrea' flowers of 'squashes' are much relished, fried in batter and bunches of same are sold in the bazar.

FORMULAS, PROCESSES & ANSWERS.

Materials for Moulding.

2110. K. L. S., Calcutta—Enquires about the principal materials used in moulding.

The principal materials used in the various branches of moulding are sand of various kinds, clay, etc.

Sand is superior to all other substances as a material for forming moulds generally. In selecting sand it is necessary to avoid that which contains crystals of gypsum; if it contains salt it must be thoroughly washed before use. Felspar, chalk, iron pyrites and coal must also be carefully avoided.

Parting sand—as its name implies, is used to prevent the various parts of a mould to be afterwards separated from adhering to each other. Red brick dust, fresh free sand, or blast furnace cinder, finely ground, may be used.

Moulding sands for green sand moulds, as distinguished from the natural rock sand referred to, is composed chiefly of the latter with a proportion of ground coal or charcoal dust added to it. These two materials must be thoroughly mixed throughout, and afterwards maintained in a suitably damp state, so that the sand mixtures now produced may have the necessary binding properties that will enable it to retain any moulded form imparted to it, and further, resist the washing action of the molten metal during the casting process.

Facing sand, for green moulds as already indicated, is made up from new rock sand, with coal dust added to it, and so specially prepared each day by one man set apart for that purpose. For proper mixing the sand and coal dust in the first place are laid on top of each other in alternate layers so as to form a mould, the size of which will, of course, depend on the amount of facing sand required. The man referred to then makes a vertical cut through the mould of sand and coal dust; that portion of the mixtures separated being turned over once or twice with the shovel, is then thrown into a riddle driven either by belt power or by hand. When the sand has thus passed through a suitable riddle it is considered ready for use.

1. FACING SAND.

Black floor sand	10 parts.
New Rock sand	5 „
Coal dust (good quality)	1 part.

2. FOR BRASS CASTING

Rock sand (new)	1 part.
Rock sand (previously used for dry sand moulds)	3 parts.

3 FILLING-UP SAND.

Floor sand (previously used for dry sand moulds)	1 part.
Dried loam powdered down	

Rock sand (good quality) 2 parts.

CORE SAND.

Rock sand (good quality) 1 part

Floor sand, already used and emptied from dry sand moulding boxes

Beeswax yellow 3 "

Black rosin 2 "

Mix, melt, and boil for 45 minutes, then add

Common turpentine 4 oz.

Boil for 3 minutes and cool. Apply locally to cuts, burns, sores, ulcers, etc. It first draws, then heals.

Smelling Salt.

2095. C. C., Calcutta.—Wants to know the process of preparing smelling salt.

Mix in a capacious porcelain mortar 2.2 lb. of ammonium carbonate with 1.1 lb. of ammonia, cover the mortar, and let it stand quietly. In the course of a few days the contents will have been converted into normal carbonate of ammonium. The latter is reduced to a coarse powder, and perfumed* with bergamot oil, 0.56 dr., lavender oil, 0.9 dr., nutmeg oil, 0.28 dr.; clove oil, 0.28 dr.; rose oil, 0.28 dr.; cinnamon oil, 2.82 dr. The incorporation of the volatile oils is effected by first triturating about one tenth of the salt with the oils, and then gradually incorporating with this perfumed mass the rest of the salt. In this manner a uniform distribution of the odour is effected.

Salve for all Wounds.

2064. M. G. S., Masulipatam.—Wants a recipe for wound and zinc ointment.

Lard, fresh 16 ozs
White lead, dry 3 "
Red lead, dry 1 "

Zinc Ointment.

Zinc ointment is used for inflamed eyelids, sore nipples, and also for ring-worm, etc. It is prepared by intimately mixing 1 part of oxide of zinc with 6 of lard

Luminous Paint.

2087. P. K. R., Muttra.—Requests us to describe a simple process of preparing luminous paint.

This may be made as follows:—

(1) Mix finely powdered calcium sulphide in any colourless varnish, or in equal parts of boiled linseed oil and turpentine, to the required consistency. The sulphides of barium or strontium may also be used. (2) Heat together, in a crucible, plaster of paris and charcoal. The resulting substance—calcium sulphide—is mixed with a vehicle as before. (3) Heat lime and sulphur together in a crucible, and well powder the residue. In each case, exposure to daylight is necessary to produce luminosity.

Essence of Camphor.

2122. K. B., Faizpur.—Asks how essence of camphor is prepared.

(1) Camphor (clean) $4\frac{1}{2}$ oz.; rectified spirit, 1 gal.; dissolve. This is essence of camphor.

(2) Camphor, 1 oz.; rectified spirit, 10 oz. (by weight); dissolve.

This is concentrated essence of camphor 10 or 12 drops added to 1 fl. oz. of pure cold water, make a transparent camphor julep.

Sand Paper.

1991 R. L. K., Sialkot City.—Desires to learn the process of manufacturing sand paper.

The device for making sand-paper is simple and at hand to any one who has occasion to use the paper. A quantity of ordinary window glass is taken (that having a green colour is said to be best) and pounded fine, after which it is passed through one or more sieves of different degrees of fineness, to secure the glass for coarse or fine paper. Then any tough paper is covered evenly with glue, having about one third more water than is generally employed for wood work. The glass is sifted upon the paper, allowed a day or two in which to become fixed in the glue, when the refuse glass is shaken off, and the paper is fit for use.

Rubber Varnish.

2016 S. S. T., Fatehgarh.—Is anxious to know the recipe of rubber varnish.

This is also known as flexible varnish.

(1) India rubber (cut small) $1\frac{1}{2}$ oz.
Chloroform ether
(washed) 1 pint.

Digest in the cold until solution is complete. Dries as soon as it is laid on.

(2) India rubber 1 oz.
Drying oil 1 quart.
Dissolve by heat. Very tough; dries in about 48 hours.

Sugar Candy.

1986. M. R., Ellore.—Enquires how sugar candy is prepared.

Sugar candy is formed when sugar is crystallised by leaving the saturated syrup, in a warm place (90° to 100°F), the shooting being promoted by placing sticks, or threads, at small distances from each other in the liquor; it is also deposited from compound syrups, and does not seem to retain much of the foreign substances with which they are loaded. Brown sugar candy is prepared in this way from raw sugar; white sugar candy from refined sugar; and red sugar candy from a syrup of refined sugar which has been coloured red by means of cochineal.

Acid Proof Paint.

1575. E. D. C., Bombay.—Wants a recipe for acid proof paint.

Dissolve 18 parts of pure raw rubber in hot linseed oil, and 2 parts of litharge and 1 part of slaked lime, and colour with red-lead or a good clean earthy pigment.

Cure for Baldness.

1738 B. B., Kasauli.—Wants medicine for baldness.

Ext. pilocarpi liq. 1 oz.
Tr. Cantharidis $\frac{1}{2}$ oz.

Lin. Saponis 2½ oz.

To be rubbed into the scalp every day.

Ringworm Ointment.

1545. A. K. T. Labutta.—Wants recipes for ringworm ointment.

Two recipes are given:—

- | | |
|----------------------------|-----------|
| (1) Salicylic Acid | 2 dr. |
| Crysarobin | 1 dr. |
| Creosote | 1 fl. dr. |
| Benzoated Lard | 4 oz. |
| (2) Carbolic acid | 2 dr. |
| Salicylic acid | 1 dr. |
| Mercuric nitrate ointment. | 2 oz. |
| Prepared Lard | 6 oz. |

Waterproofing Hat.

1765. M. M. R., Colombo.—Requires some hints for waterproofing hats.

For waterproofing a soft felt hat, sponge the inside of the hat with a warm solution of soap, 2 oz. to the pint, then apply a solution of alum, 2 oz. to the pint and dry. If the hat is a light coloured one, it could be dipped first in the soap, and then in the alum; this will more effectually waterproof the hat.

Felt hats are also rendered almost water-proof during manufacture by treating with a solution of shellac in spirit. The shellac not only renders the hats waterproof, but also gives the stiffening required, and allows of the necessary shaping and blocking. A felt hat if not properly waterproof could be treated inside with a solution containing 2 oz. of shellac in 1 pint of methylated spirit, but a black felt would show the coating, and would need the addition of a little aniline black to the solution.

Light coloured felts may be first sponged inside with a hot soap solution, followed by a solution of alum. These materials must be used sparingly for if they soak through the hat a stain would result.

Lubricating Oils.

1718. A. D., Bilimora.—Requires some hints on lubricating oils.

The chief lubricating oils used for machinery, etc. are petroleum oils of high flash point, and vegetable oils such as rape, castor, olive, etc. In preparing such oils the principal thing to take into account is the kind of machinery for which they are to be used. For very light machinery and high velocities really fluid oils, such as mineral oils are employed, either alone or in mixture with olive oil. For medium class machinery, rape or castor oil, or heavy petroleum are used and for very heavy machinery fats such as tallow, and greases made from tallow or resin oil mixed with lime, also palm oil, etc. As petroleums are usually, very fluid they are often mixed with "blown" oils—that is castor, rape, or cotton seed oils which have been artificially thickened by blowing air through them during heating.

Dissolving Bones for Manure.

1744. B. V. B., Cöcanada.—Wants to know the process of dissolving bones for manure.

In making dissolved bones, the fat is first removed; this is done by boiling with water in an open pan such as a washing copper; the water is run off, and the fat removed when cold. For making a small quantity of dissolved

bones, a wooden tank lined with sheet lead, and a leaden tank in which to mix the acid should be provided. The sulphuric acid of specific gravity 1.84 should be diluted by pouring it into water, the proportions of water and acid being equal parts by weight or 10 parts of acid to 18 parts of water by volume and the specific gravity of the mixed acid about 1.55. The bones, after boiling as above, should be put through a crusher and passed through a sieve with a $\frac{1}{2}$ in mesh; 5 cwt. of the crushed bones should be placed in the lead-lined tank, and then 66½ lbs or 4¼ gals. of the diluted sulphuric acid added, and the whole thoroughly stirred with a wooden paddle when the manure has set, it can be dug out, but if required in a liquid state, sufficient water should be added to make the manure fluid.

Glazing Bricks.

1726. G. H. H., Bombay.—Asks how to glaze bricks.

Only strong refractory clays that will stand a high temperature are fitted for salt glazing. Though the process is simple, a number of experiments will doubtless be necessary before a satisfactory result is obtained. When the bricks have been fired and the kiln is at its full heat, and the fire holes are bright and clear a small shovelful of rough salt is thrown into each fire hole, which is then banked up or covered over. In about an hour the process is repeated, only a trial drawn to see how the glazing is progressing. The salting is again repeated if need be and when considered satisfactory the kiln is given a final firing and

allowed to cool down—a process which may take from twenty-four to thirty-six hours. The same amount of heat required to volatilise the salt would nitrefy red clay, with the result that the bricks would be stuck together in one mass. In certain brick yards, where the fire clay is of a particularly refractory nature, it is customary to add a small proportion of red clay. The proportion will, of course, vary according to the nature of the clay, and to ascertain it is a matter of experiment. The advantage of using a small quantity of red is that, since it will flux or nitrefy before the white is very hard backed it tends to bind the particles in the white together.

Silvering Mirror.

1152. C. C. S., Beawar.—Requires hints on silvering glass.

Dissolve 60 grains of silver nitrate in 1 oz. of water, and pour this solution quickly into a boiling solution of 48 grains of rochell salt in about 1 oz. of water. On cooling, filter the liquid, and make up to 12 fl. oz. with distilled water. Dissolve 60 grains of silver nitrate in 1 oz. of water, then add ammonia until the precipitate is nearly re-dissolved, and make up to 12 fl. oz. as before. For silvering equal volumes of these liquids are mixed just previous to using.

Removing Stains.

283. P. K. R., Madras.—Wants some recipes for removing stains.

Grease spots may be generally removed from the most delicate material by the employment of benzine or oil of turpentine, care being taken that sufficient be employed to remove all line of

demarcation. If the stain be very thickly crusted and old, it may be sometimes advantageous to soften the grease, (previous to the application of benzine) by means of a warm iron laid on a piece of thick blotting-paper which has been placed over the spot.

Tar and pitch produced stains can be easily removed by successive applications of spirits of turpentine, coal-tar naphtha, and benzine. If they are very old and hard, it is as well to soften them by lightly rubbing with a pledge of wool dipped in good olive oil. The softened mass will then easily yield to the action of the other solvents.

Paint stains may be treated with oil of turpentine to remove the oil, with oxygenated water to oxidise the lead, and finally, with dilute acetic acid. If the paint contains oxide of iron, oxalic acid will have to be used, while the copper colours must be treated with liquor ammonia.

Lubricants generally contain, besides grease, oxide of iron worn off the machinery, etc., hence the grease must first be extracted, by means of benzine, ammonia etc., and then the spot treated with oxalic acid or chloride of lime water or even lemon-juice, if the material is very delicate. Rinsing must always follow the application of these agents.

Blue Print with Ferroprussiate.

2125. P. C. P. S., Wadhwan Camp—Desires to be enlightened on the process of blue printing with ferroprussiate paper.

Ferroprussiate paper is prepared by covering one side of the sheet with a

mixture of red prussiate of potash (potassium ferrocyanide) and iron peroxide; under the influence of light, i. e., under the white portions of the drawing to be copied, the ferric compound is reduced to the state of a ferrous salt, which gives with the red prussiate of potash an intense blue coloration, analogous to prussian blue. This coloration is not produced in the portions of the sensitive paper protected from the light by the black lines of the drawing to be copied, and on washing the print the design appears in white lines on a blue ground. The formula for preparing the sensitive paper as follows:—Dissolve 10 dr. red prussiate of potash (ferrocyanide) in 4 oz. water; dissolve separately 15 dr. ammonia-citrate of iron in 4 oz. water; filter the two solutions through ordinary filtering paper and mix. Filter again into a large flat dish, and float each sheet of paper to be sensitised for 2 minutes on the surface of the liquid, without allowing any of this to run over the back of the paper. Hang up the sheets in a dark place to dry, and keep from light and dampness until used. They will retain sensitiveness for a long time. The paper being ready, the copy is easily made. Procure either a heavy sheet of plate glass, or a photographer's printing frame, and lay the drawing to be copied with the face against the glass; on the back of the drawing lay the prepared side of the sensitive paper, place upon it a piece of thick felt, and replace the cover of the printing frame, or in some other way press the felt and papers firmly against the glass. Expose glass side up, to sunshine or diffused day light,

for a time, varying, with the original drawing from minutes to hours. It is better to give too much than too little exposure, as the colour of a dark impression can be reduced by long washing, while a feeble print is irremediably spoiled. By leaving a bit of the sensitive paper projecting from under the glass, the progress of the coloration can be observed. When the exposure has continued long enough, the frame is opened and the sensitive sheet is withdrawn and thrown into a pan of water to be replaced immediately by another, if several copies are desired, so that the exposure of the second may be in progress while the first is being washed and fixed. The water dissolves out the excess of the reagents used in the preparation of the paper, and after several washings with fresh water the print loses its sensitiveness and becomes permanent. It is advantageous after several washings with water, to pass over the wet surface a weak solution of chlorine or of hydrochloric acid, 3 or 4 parts acid to 100 of water, which gives brilliancy and solidity to the blue tint, and prevents it from being washed out by long soaking. This should be followed by 2 or 3 rinsings with fresh water, and the print may then be hung up to dry, or placed between sheets of blotting paper.

Uses of Soda Phosphate in dyeing.

1935. M. M. S., Madura.—Asks what are the uses of soda phosphate in dyeing?

Sodium phosphate is used as a substitute for the arsenate in fixing aluminium and iron mordants. It does not, however, always act so well as the arsenate, because aluminium phosphate is not insoluble under certain conditions. Sodium phosphate produces no precipitate in a large excess of aluminium sulphate.

Decorating Glass.

2180. B. P. S., Basti.—Requires hints for decorating glass.

Glass is chiefly decorated by the process known as etching. Etching is done by means of hydrofluoric acid, the only acid which will attack glass. The piece of glass to be etched is covered with some substance called the "resist," on which the acid has no effect. The substances commonly used for the purpose are beeswax, paraffin, tallow, resin, rubber compounds, and metallic lead. Beeswax is quite expensive but very satisfactory because it melts easily and may be applied with a brush and because it is also easily removed.

The two processes employed are:—

- (a) Needle etching,
- (b) Plate etching.

For needle or machine etching small needles are arranged in moving arms which pierce through the resist and outline the pattern on the glass. The machines are operated by electricity or by compressed air. The article is then immersed in hydrofluoric acid, which instantly attacks the uncovered glass. Needle-etched designs are always symmetrical—a series of straight or zigzag lines, circles, curves, etc. The method of plate-etching allows much greater freedom of design, but it also requires skilled labour and is therefore more expensive. The design is first cut in a metal plate and then a print is taken from the plate on tissue paper. From the tissue paper print it is transferred to the glass, which is then coated with the resist around all of the designs.

After the acid has eaten out the pattern, the wax is removed by placing the article in boiling water and steam.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

1737 M. R. C. H., Bellarul—For wick making machines enquire of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

1739 J. F. W. Jharia—You may start manufacturing galvanized zinc, etc. It has a good demand now in the market. Before launching upon the business calculate the estimates of expenditure to ascertain whether it will be profitable in the face of foreign competition.

1740 M. I., Katchpur—For registering the articles manufactured by you write to P. Lodge & Co., Post Box No. 672, Calcutta.

1741 R. D. J., Almora—Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta, may serve your purpose. Sweater, socks, etc. knitting goods may be supplied by E. B. Bros. & Co., 11, Dharamtola Street, Metharam Navalrao & Co., 6/A, Lindsay Street, G. Ram Chand & Co., 7/B, Lindsay Street, and Obhoy Churn Law & Bros., 8, China Bazar Street, all of Calcutta.

1742 A. W. M., Faridpur—Refer your query regarding water hyacinth to the Director of Agriculture, Ramna, Dacca, who will solve your difficulties and give useful suggestions for utilizing water hyacinth. A good recipe of face cream appeared in July 1923 issue of **Industry**. For speedy sales of articles you deal in advertise in newspapers and periodicals and appoint canvassers and agents. For driving away white ants sprinkle calomel solution. Papaw is a good liver tonic and antidote for constipation.

1743 P. L. B. Ambala Cantt—Soap making machineries may be supplied by Sowers Manufacturing Co., Buffalo, New York, U.S.A.

1745 M. R., Secunderabad—For embroidery machines enquire of Singer Sewing Machine, 17, Esplanade Mansions, Calcutta. You will have to weave the cloth in a special kind of loom. For this kind of loom apply to Bros.

Partners & Co., 35 Ezia Street, Calcutta with particulars.

1746 K. B., Bombay—For wooden moulds try Bharat Chitralaya, 354, Upper Chitpore Road, Calcutta.

1747 D. A. M. M., Dindigul—Musk may be had of Himalayan Store, Kasauli Hills. Other ingredients may be bought of Madhab Ch. Daw, 4, Armenian Street, Calcutta.

1749 N. T. M., Karachi—A book on ink manufacture is going to be published very soon from this office. This book contains recipes of all kinds of ink.

1751 R. K., Guntur—Ghee is not exported to Continental countries. It is exported to Straits Settlements, British East Africa, etc. 150 German marks were approximately equal to Rs. 100/- on the 12th instant. In order to be acquainted with the procedure of export trade go through the 1st and 2nd volumes of **Commercial India**, the sister journal to **Industry**. You may communicate with Singha Castor Oil Factory, Alambazar, 24, Parganas whether the party is interested in castor seeds. For disposing of castor oil you may enquire of Anath Nath De, 3, Maidputty, Ba. a Bazar, Calcutta whether he is willing to buy castor oil from you.

1753 A. R. S. R., Bombay—Process of deodorising Kerosine oil appeared in the last issue. But the process will not fulfil all the conditions mentioned in your letter.

1754 M. T. C., Surat—For books on rubber stamp making enquire of Chakraverty Chatterjee & Co., Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta. For bromide and p. o. p. glazed post card enquire of Photographic Stores & Agency Co., 154, Dharamtola Street and Calcutta Camera House, 158, Dharamtola Street; both of Calcutta.

1755. R. N. S. S., Bijapur.—Camphor powder may be bought of Madhab Chandra Daw, 4, Armenian Street and Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar; both of Calcutta

1757 R. N. R., Bangalore City—Toys may be bought of Chichgar's Toy Works, Karachi, Eastern Trading Corporation, 'P-14, Central Avenue, Calcutta, Sheik Nazir Ali, 5, New Market, Calcutta and Premier Toys & Novelties Co., 129-132, North Range, New Market, Calcutta. Wants to be put in touch with toy dealers of Pondicherry

1758 N. S., Benares—Adler sewing machines, needles, etc., may be supplied by Kochs Adlernahmaschinenwerke A-G, Beliefeld, Germany. For embroidery machines enquire of Singer Sewing Machine Co., Esplanade Mansion, Calcutta. For inks you are referred to Ink Manufacture to be published shortly from this office.

1759. S. M. I., Cawnpore—The Indian Industrial Guide is out of print now.

1760 R. H. P., Karachi—Photo camera may be bought of Photographic Stores & Agency Co., 154, Dharamtola Street, Calcutta. An article on photography appeared in last issue. For books on photography enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1761. N. K. V. I., Coimbatore.—Chemicals and scientific instruments may be had of Premier Indian Scientific Co., 12, Second Line Beach, Neelakantam & Co. Ltd, Vepery and Eastern Commercial Co., 28, Second Line Beach; all of Madras.

1762. V. C. W., Gujranwala—Wants to be put in touch with German silver sheet suppliers of Calcutta, Bombay and Karachi. Canes may be supplied by Malayan Cane & Timber Co., 10, Sukea's Lane, Kanari House, Calcutta; Overseas Cane Supplying Co., 102, Doctor Durga Charan Road, Calcutta; M. Augulia & Co., and David Sasoon, De Souza Street, last two of Singapore. Canes are used in basket and chair making. Shellac may be had of Madhab Chandra Daw, 4, Armenian Street, Calcutta. Wants to be

introduced to stag horn merchants of Dehra Dun and Saharanpur.

1763 S. V. A., Bhandara—For analysis write to R. V. Briggs & Co., 8/B, Lall Bazar Street, Calcutta, and Hughe & Davis, Stock Exchange Bldgs., 139, Meadows Street, Fort, Bombay.

1764. A. M., Gujrat—Wants to be put in touch with dealers in old coat and cloth pieces of Bombay, Calcutta and Karachi.

1766. M. R. B., Bhera—A good recipe of Horlick's malted milk appeared in July 1923 issue. You may go through Mercantile & Mail Order Letters and Methods by K. M. Banerjee for advertisement writing.

1767 P. C. G., Mymensingh—An article on cigar manufacture appeared in September 1920 issue of **Industry**.

1770 K. C. L., Khurda—For indigenous spices and other ingredients enquire of Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar, Calcutta. For stocking rectified spirit you have to secure license from excise department. Colloidian may be had of the Photographic Stores & Agency Co., 154, Dharamtola Street, Calcutta. Venice turpentine may be bought of Haridash Rockit & Co., 45, Clive Street and Hanooman Prasad & Co., 2, Bonfields Lane; both of Calcutta. You may manufacture the medicines but you cannot sell them under the patent name

Golden Chance

FOR PERFUMERS & SOAP-MAKERS.

Give trial order. Satisfaction guaranteed. All makes. All Sorts. All qualities. Avail yourself of our long-standing experience in Perfumery line, and our big stocks of varied Foreign Essential oils, Ottos, Extract and other Raw Materials; White Oil, Empty Glass phials, Corks, Capsules and other Fancy Packing material too numerous to detail.

SIKRI & CO.,
POST BOX No. 2287. CALCUTTA.

1772. B. J. A., Tirupur.—The book on cotton crop you require may be had of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. This firm will also supply you with catalogues of commercial books.

1773 S. A. A., Plassy—You may consult the following journals: Modern Review, 92, Upper Circular Road, Calcutta; Calcutta Review published by the Calcutta University, Senate House, Calcutta; Indian Review published by G. A. Natesan & Co, Madras; Literary and Musical Review, 40, Sackville Street, London, W. 1; Literary Digest, Tunk & Wagnalls Co, 134, Salisbury Square, London, E. C. 4; Literary Guide, Walter & Co, 17, Johnson's Court, Fleet Street, London, E. C. 4 and Literature, C. H. Edmonds, 17, Hart Street, London, W. C. 1

1774. M. R., Bilaspur—Collection of empty match boxes and used postage stamps is a kind of hobby

1775 H. C. B., Palitana—Pill making and coffee grinding machines may be had of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. Glass time keepers may be supplied by Anglo Swiss Watch Co, Dalhousie Square, Calcutta.

1776. K. Bros., Falpur—In making bins no machine is required. Recipes of perfumery will be found in September 1924 issue of *Industry*. For hair oils you may go through the booklet The Hair Oil Manufacture published from this office

1777. B. B. L. G., Najibabad—Scientific instruments may be supplied by Adalbert

Langguth, Ilmenau Thuringen, Germany and Endacott Scientific Instrument Co., 22 & 23, Virulam Street, London, E. C. 1. Patent medicines may be supplied by W. Lamber & Co, Ltd, 258, Euston Road, London, N. W. 1; Castle Laboratory, 18, Jeffrey's Place, Camdent, London, N. W. 1, Brema G. m. b. H, Weimarstrasse 42, Stuttgart, Germany and A. Heimburger Nachfolger, Munster i Westfalen Germany

1778 K. V. I., Benares City—For second hand and rebuilt printing presses write to T. C. Thompson & Son Ltd, Buxton Street, London Road, Manchester, England.

• • 1780 M. V. K., Nova Goa—It will not be suitable for you to import silk laces, stockings, thread balls, etc. from foreign countries as you are new in the line. You may, however, correspond with the following parties: Ehrsam Denzler & Co, Waldenswil, Switzerland; Jacob Laib & Co, Fabr de Bonneterie, Amriswil, Switzerland, Jub Paul Schmuds Eibenstock, 1 sa, Germany and Rosenkranz & Co, G. m. b. H, Barmen, Germany.

1783 V. P. C., Madura—Picture post cards may be supplied by Curt Hoinakis, Hamburg 8 E. F., Germany and Stern & Schiele, Berlin, Germany. Telescopes may be supplied by Spencer Lens Co, Philadelphia, Pennsylvania, U. S. A. For tubes of required description write to National Tire & Rubber Co, East Palestine, Ohio, U. S. A. Gordon Fire & Rubber Co, Canton, Ohio, U. S. A. Playing cards may be supplied by Russell Playing Card Co, New York and United States Playing Card Co, Cincinnati, Ohio, both of U. S. A. For German addresses of scientific instruments dealer vide No. 1777

1784 I. A., Irinjalakuda—An article on photography appeared in last issue; you are also referred to June 1926 issue. Of all the dailies, The Servant, 1, Nuzurimull Lane, Calcutta, is perhaps the cheapest.

1786 B. S. G., Dohad.—You may go through The Art of Soap Making by Alexander Watt to be had of Chakraverty Chatterjee & Co, 15, College Square, Calcutta.

THE ONLY TIME TO ENCOURAGE. SWADESHI INDUSTRY.



Purchase KIRLOSKAR PUMPS.

Write for full particulars to Sole Agents—for India, Ceylon, etc.

K. B. JOSHI & CO.,

321, Hornby Road, Fort, Bombay,

Post Box No. 534.

Calcutta—84A, Clive St.,

Post Box No. 675

Karachi—Bunder Road,

Post Box No. 230

Madras—Post Box No. 1260

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices

1787. S. R. A., Madras—Formulas of Soap appeared in April 1925, July 1925, August 1925, November 1925, January 1926 and March 1926 issues of **Industry**. Soap making perfumes may be had of Sicker & Co., 548, Canning Street, Calcutta.

1788 J. S. Y., Nagercoil—For envelope making machines enquire of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta. For selling shuttles you may write to Bros., Partner & Co., 35, Ezra Street, Calcutta, whether they will take your articles.

1791 S. S. G., Bikaner—Matches may be had of H. Rashid & Co., 15, Zakariah Street Lalchand Bros. Match Depot, 33A, Central Avenue, and F. C. Nallidaroo & Co., 501, Canning Street, all of Calcutta. Cigarettes may be bought of Imperial Tobacco Co., Ltd., 5, Fanthe Place, Calcutta and Great American Tobacco Co. Ltd., Dum Dum, Calcutta. Sun-light soap may be supplied by M. Framoze & Co., 9, Rank Street, Bombay. Toilet soaps and other perfumeries may be supplied by Ezekiel, 52, Canning Street; Mohamed Enamulla & Co., 8 & 9, Colootola Street and Pyne Bros., 431A, Canning Street, all of Calcutta.

1792 V. S. R., Tanuku—Pencils may be supplied by J. S. Staedtler, Mars Pencil Works, Nurnberg, Germany, Hand Pencil Co., Nurnberg, Germany, S. Hada, 126, Shichome, Honmachi, Kyoto, Japan, Akmo Hatton & Co., 3, Yariya-cho, Kyobashiku, Tokyo, Japan; Red River Lumber Co., Minneapolis, Minn, U. S. A.; Eberhard Faber, Brooklyn, New York, U. S. A.

1793 K. C., Nagaram—You perhaps mean co-operative banks. For a list of such banks write to the Registrar, Bengal Provincial Co-operative Banks, Writers Bldg., Calcutta. For books on banking write to Kamala Book Depot Ltd., 15, College Square, Calcutta. For articles and memoranda of Imperial Bank of India write to the Secretary, Imperial Bank of India, Strand Road, Calcutta.

1794. T. H. R., Sathamibadi—It is not possible to manufacture ink powder to be used in fountain pens. A good recipe of fountain pen ink appeared in August 1924 issue. Process of

preparing metal polish appeared in April 1925 issue. A formula of soap powder appeared in August 1925 issue.

1795 D. S., Dalman—For patent registration write to P. Lodge & Co., P. O. Box No. 6772, Calcutta.

1796 N. C. B., Lahore—For small machines such as cream separator, etc., enquire of The Swedish Trading & Engineering Co., 1313, Old Court House Street; Edward Kaventers Ltd., 61, Lindsay Street; W. Leshe & Co., 19, Chowringhee Road, and Indo German Trading Co., 11, Dalhousie Square, all of Calcutta. Wants to be put in touch with dealers in wooden spoon, bowls, etc.

1797 D. C., Poona City—Black and white peppers may be bought of Madhab Chandra Daw, 4, Armenian Street, Calcutta. For trade mark registration enquire of P. Lodge & Co., Post Box No. 6772, Calcutta.

1798 H. S., Bahraich—Refer to No. 1574 above.

1799 J. B. M., Dhoraji—You can test the purity of ghee by chemical analysis or simply by flavour when boiled.

1801 S. K. M. Bombay—A series of articles on export trade appeared in the 1st and 2nd volumes of **Commercial India**, the sister journal to **Industry**. Black boards for schools and maps of all Indian railways may be bought of Indian School Supply Depot, 309, Bowbazar Street, Calcutta.

1802 M. L. S., Nasirabad—The following are some of the chemists of Bombay—R. Chhotalal & Co., Princess Street; Oriental Drug and Chemical Co., Opp. Juma Masjid and H. R. Modi & Co., 10, Fida Bldg., Princess Street.

SETT DEY & Co

ORIGINAL HOMEOPATHIC PHARMACISTS,

42 Strand Road, Calcutta.

Dealers in Original Homeopathic dilutions
and Biochemic Triturations

Catalogue Free On Application

1803 R M. W. Poochakapatti—For melting and moulding iron you are referred to a mechanical engineer. For gold wire drawing machinery write to Duncan Mackenzie Sons Co, Trenton, New Jersey, Standard Machinery Co, Auburn, Rhode Island and Waterbury Farrel Foundry & Machin Co, Waterbury, Connecticut; all of U S A.

1804 N S, Kot Adu—Process of preparing mirror appeared in December 1925 issue

1805. I. C., Ahmedabad—Tiles may be supplied by American Encaustic Tiling Co, Ltd, New York, U S A, Beaver Falls Art Tile Co, Beaver Falls, Pennsylvania, U S A, Boletto Settimo, Chiavari, Italy; Solary Antonio, Chiavari, Italy, H. Konner, Isenstrasse 6, Hamburg, Germany; Ziegelwerke Drage U Salzhausen G m b H, Brodschangen, Hamburg, Germany; Burke & Co, 43, Rathbone Place, London, W 1 and Doulton & Co Ltd, 28, High Street, Lambeth, London, S E 1

1807 A A R, Cocanada—The recipe of the sample sent by you is not known exactly. But recipes of similar things appeared in December 1925 issue of **Industry**.

1808 L E R Porayar—Process of silvering mirror by means of silver nitrate appeared in February 1926 issue

1809 B S R, Balha—An article on flour milling industry appeared in August 1925 issue. *Wants to buy soapstone powder

1810 M A R, Kynore—Hindi equivalents of tamarisk is "Jhav" and "Jhan"

1812 K R N, Thakurdwara—Full address of Sir Ganga Ram Business Bureau and Library is Sleem Bldg, McLegan Road, Lahore.

1813. K. C M., Benares—Vide No 1522 in the last issue.

1814. T. R D, Chindwara.—Oils may be bought of Anath Nath De, 3, Moidaputty, Bara Bazar, Calcutta. Chemicals may be supplied by B. K Paul & Co, 113, Bonfields Lane and Champaklal Bros, 72, Canning Street; both of Calcutta. Wax may be had of Banshidhar Dutt & Sons, 126, Khenraputty, Bara Bazar, Calcutta. Iron may be bought of Balmer Lawrie & Co, 103, Clive Street, Calcutta.

1815 A K, Banosa—For dies for card boxes enquire of Jests' Engineering Co. Ltd, 6 Mangoe Lane, Calcutta; Eastern Machinery & Engineering Co Ltd, 15 Canning Street, Calcutta and D K Das & Co, 277 Bellissimo Road, Howrah.

1816 R V S Sons, Bijapur—No other process is known to us. If you write your difficulty clearly we shall try to solve it.

1817. C B, Poona—Process of preparing hair removing powder and soap appeared in August 1926 issue

1818 R D J, Alnora—Toys may be had of Frenchmen Brothers, Hornby Road, Bombay; R K Motishaw & Co, Hammum Street, Bombay, and Chichlga's Toy Works, Karachi. You may consult Standard Indian Commercial Directory published by Khosla Bros, Railway Road, Lahore. Sporting goods may be supplied by Bombay Sports Depot, Dhobi Talao, Bombay; Sind Supply Stores, Bunder Road, Karachi, Gujarat Sports Supply Co, Dhobi Talao, Bombay and Daryanamal & Bros., Elphinstone Street, Karachi.

1819 B N Gohana—Hydrometers may be supplied by Scientific Instrument Co. Ltd, Jhonstongonji, Allhabad and Scientific Supplies Co, 29, College Street Market, Calcutta. Other scientific instrument and apparatuses you require may be supplied by the above firms. For preparing ordinary carbolic soap melt rosin, curd soap and crutch in about 2 per cent of carbolic acid in crystals. Place in a frame, and when cold cut into squares and mould in the same way as ordinary fancy soaps.

1820 B. A. S B, Amritsar.—For a list of newspapers to put advertisement in write to Calcutta Advertising Agency, 15, College Square,

BOSE & COMPANY

General Order Supplier & Dealers In:

All sorts of Canes, Bamboo Root Polo Balls & Raw Products & etc. The best house for placing orders. If you are in need of anything please to book your order with.

BOSE & COMPANY,

23 Ram Rattan Bose Lane, Shambazar, Calcutta.

Calcutta and Rao's Advertising Agency, P. O. Box No. 49, Madras.

1821. S. A. R., Bareilly.—Watches may be supplied by Cortebert Watch Co., La Chaux-de-Fonds, Albert Donard, Bienne; Rolex Watch Co., Bienne; Oris Watch Co., Holstein and Schild & Cie, La Chaux-de-Fonds; all of Switzerland.

1822 N. C. C., Gangtok.—Your idea is unworkable. Chinaware vessels can neither be cut nor melted. For joining broken pieces of Chinaware vessels apply a kind of cement used for this purpose.

1823 V. G. S. C., Madras.—For phenyle and absorbent cotton write to the following chemists of Germany: Chemische und Metallurgische Produkte, Hideronuerstrasse 167530 G. m. b. H., Berlin; A. Heimbürger Nachf. Chem. Works, Muster 1/2; Julius Grossmann, Catherinestrasse, Hamburg; Chemical Works Ara Wuzzburg, and M. R. Marcus, Hamburg 36.

1825 K. M. B., Kapadwary.—Second-hand books may be supplied by W. G. Toyle Ltd., 125/128, Charing Cross Road, London, W. C. The Times Book Club, 380, Oxford Street, London, and A. F. Denny, 147, Strand, London, W. C. 2.

1826. K. S. R., Srungavaktham.—In manufacturing soap you will have to secure some iron pans for boiling soap lyes and soap stamps which may be supplied by S. A. Manan, 82, Machua Bazar Street, Calcutta.

1828 S. G. P., Hossur.—Process of preparing water colours appeared in August 1923 issue of **Industry**.

1829 H. D., Amritsar.—Process of preparing artificial slate appeared in April 1925 issue.

1831. K. P. M., Gopalpur.—For hand-driven rice mill write to Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

1832. H. S. B., Karachi.—For particulars of the joint-stock companies write to the Registrar, Joint-Stock Companies, Government Place, Calcutta. Wants to buy old iron scrapes, rags and fruits in large quantities.

1833. S. R., Cocanada.—Plantain trees die perhaps due to some defect in soil. Use some

nitrogenous manure. Recipes of red marking ink appeared in September 1923 issue. Recipes of tilak used by ladies on their foreheads will be found in December 1925 issue. Used nibs cannot be repaired. Solid tyres would be very inconvenient for cycles as these are very heavy.

1834 N. M. S. C. Patiala.—We have no publication on mica; you may however go through Mica Its History, Production and Utilization by Hans Zeidler to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

1837. V. S. A. P., Yeotmal.—For types enquire of the Madras Type Foundry, 15, Sun-kuram Chetty Street, Madras and Gujrafi Type Foundry, Gaiwadi, Girgaon, Bombay.

1838 J. S. J. N. S., Jharia.—Iron and coal may be supplied by Balmer Lawrie & Co., 163, Clive Street, Calcutta.

1841 B. P., Narsinghpur.—Dies for gold and silver may be had of A. J. Sur & Co., 233, Upper Chitpur Road, and S. Paul & Co., 232/1, Upper Chitpur Road; both of Calcutta.

1842 G. C. S. Masulipatam.—Your name has been entered in our directory for future reference.

1843 V. S. N. M., Chatrapur.—For Horlick's malted milk write to Sharma Banerjee & Co., 43, Strand Road, Calcutta.

1844 M. C. O., Cannanore.—Fishing nets may be supplied by S. Hada, 126, Shichome, Honmachi, Kyoto and Anuta Shoten, Aichimachi, Nagoya, Aichi-ken; both of Japan.

Kaminia Oil

(Regd.)

Finest dressing for the Hair Delicately perfumed. Re. 1/- per bot charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot. of $\frac{1}{4}$ ounce Rs. 2/-, $\frac{1}{2}$ ounce Re. 1/4-. V. P. & Packing extra.

Above products have the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,

P.O. Box 2062, Juma Masjid, Bombay.

1845. M. O. B., Russellkonda.—Glass plates, tin plates, picture frames, etc. may be supplied by Fotic Lall Seal & Sons, 10, Swallow Lane and Hem Chandra Chandra, 13, Swallow Lane; both of Calcutta.

1846 N. R. C. L., Muktsar.—The following firms deal in cotton: Damji Kalyanji & Co, 307, Dongri Street, Mandvi, Bombay; Bombay Cotton Co, The Bombay House, 265/67, Hornby Road, Bombay; David Sasoon & Co, Ltd., 4, Lyons Range, Calcutta; Lachhmandas Surajmull, 187, Cotton Street, Calcutta; Carnatic Cotton Co, 41, Linge Chetty Street, Madras and Veljee Kanjee & Co., 235, Govind Gali, Naik Street, Madras. Following are some of the popular newspapers of India: Amrita Bazar Patrika, 2, Ananda Chatterjee Lane, Baghbazar, Calcutta; Forward, 19, British Indian Street, Calcutta; Statesman, 6, Chowringhee Road, Calcutta; Englishman, 9, Ilare Street, Calcutta; Bombay Chronicle, Meadows Street, Fort, Bombay; Indian Daily Mail, 24-26, Dalal Street, Fort, Bombay; Times of India, Bombay; Daily Gazette, P. O. Box 119, Karachi; Leader, 14-A, South Road, Allahabad, Hindu, 100, Mount Road, Madras and Madras Mail, 6, North Beach Road, Madras.

1847 E. S. Kangra.—Your enquiry is receiving our attention

1848. M. C. O., Cannanore.—It will be advisable for you to consult a manual on chocolate making which may be bought of Thacker Spink & Co, 3, Esplanade East, Calcutta

1849. M. M., Kotri.—For dyeing you are referred to August and September 1925 issues of **Industry**. In dry washing benzine is generally used. The process is a complicated one involving use of big machineries used for the purpose. Process of discharging colours will be found in August 1925 issue.

1850 N. D. P. L., Rohri.—Process of bleaching yarn appeared in the last issue. You may wash yarn and piece-goods with caustic soda solution. Try to secure washermen locally. Engage washermen who will wash cloths supplied by you on wholesale rates. It will not be suitable for you to wash cloths yourself when you are going to start a dyeing and cleaning business. A formula of washing soap with coconut oil will be found in January 1926 issue. Rich cloths and embroidered articles should be washed with soapnut solution. For dry washing you will have to apply laundry machinery.

1851. R. S. Gaya.—Platinum may be bought of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

1852 V. C. W., Nizamabad.—German silver and nickel sheets may be bought of Balmer Lawrie & Co, 103, Clive Street, Calcutta; E. A. Currim, 97, Apollo Street, Bombay and Adamjee Boodhabhoy & Sons, Old Jail Road, Karachi.

1853 P. R. S., Rawalpindi.—For magnet stone enquire of Scientific Instrument Co., Ltd., Johnstonganj, Allahabad and Scientific Supplies Co., 29/32, College Street Market, Calcutta.

1854 C. R. R., Bellary.—Consult an expert in cotton baling press for detail information regarding cotton press installation.

1858 K. R. M., Hoshiarpur.—Medical dictionaries may be supplied by Butterworth & Co, 8, Hastings Street, Calcutta. Chemical Dictionary may be had of G. N. Mytu, Kingsway Camp, Delhi.

1859. M. I., Hyderabad.—An article on boot polish appeared in May 1923 issue of **Industry**. Boot polish pots may be had of Calcutta Tin Printing Works, Post Box No. 6772, Calcutta.

1860. C. T. D., Chichan.—The following are some of the well-read newspapers of India:

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College

USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers

Factory—Baranagar and Barisal,

Office—113, 114, Khagrapotty St., Calcutta.

Statesman, 6, Chowringhee, Calcutta; Englishman, 9, Hare Street, Calcutta; Forward, 19, British Indian Street, Calcutta; Hindu, Mount Road, Madras; Rangoon Times, 7, Merchant Street, Rangoon; Bombay Chronicle, 3, Meadows Street, Fort, Bombay and Times of India, Bombay.

1863 F. B. Calcutta—For seeds try Nurjehan Nursery, 9, Kankurgachi Lane, Calcutta.

1864 A. K. A., Ennakulam—For candle wick preparing machine enquire of Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta.

1865 N. S., Jamshedpur—We are not aware of such firms at present.

1869 A. S., Dornel—A good formula of toilet soap appeared in April 1925 issue. You may use carbolic soap for skin diseases. A recipe of carbolic soap will be found in July 1925 issue. Process of preparing dyer's soap appeared in September 1924 issue. It is not possible to drive away ants by using soap. Lemon grass oil may be had of P. Mukherjee & Co., 29/31, College Street Market, Calcutta. S. Milakanta Iyer, Avanavanchery, Attungal Chemicals you require may be bought of B. K. Paul & Co. 1-3, Bonfields Lane, and D. Waldie & Co., 1, British Indian Street; both of Calcutta. For hemp stitching machine enquire of Indo-German Trading Co., 11, Dalhousie Square, Calcutta.

1871. G. R. N. Salem—A good recipe of odourless depilatory appeared in June 1924 issue. A recipe of tooth powder will be found in March 1925 issue. The ingredients used in depilatory and tooth powder may be had of B. K. Paul & Co., 1/3, Bonfields Lane, Calcutta. No such dictionary is known to us. Try to secure cows locally.

1873 M. R. R. I., Salem—An article on rose-water manufacture appeared in April 1925 issue. Elder-flower water may be bought of Sickri & Co., 55/4, Canning Street and P. Mukherjee & Co., 29/31, College Street Market; both of Calcutta.

1874. A. C. S. R., Colombo—To dispose of products of Ceylon advertise in the pages of **Industry**.

1876 H. K., Warangal.—Soda water ing machines, bottles and essences now bought of Amuchand Mehra & Son, Armenian Street, Calcutta and Vital Karsondas, 364, Upper Duncan Road, Two T. Bombay No. 8.

1877 G. P. M., Trichinopoly.—For the book required write to W. Newman & Co., Old Court House Street, Calcutta.

1878 H. S., Kanker—You may use tractor engine and ploughs. Rice hulling machines and oil engines may be supplied by Marshall Sons & Co., 99, Clive Street, Calcutta. For oil mills write to Burn & Co., Hongkong House, Council House Street, Calcutta.

1879 A. A., Kotah—Wants to be put in touch with dealers in horn and Indian drugs and produce.

1880 P. C. N., Allahabad—For registering trade mark you may correspond direct with P. Lodge & Co., Post Box 6772, Calcutta, who will supply you with all necessary information.

1881 S. S. L., Cawnpore—For starting business with a small capital you may go through New Idea Columns and Small Trades and Recipes columns of **Industry**.

1882 A. N. N., Guntur—For manufacturing hair oils you may go through the booklet Hair Oil Manufacture published from this office. A simple process of bleaching oils appeared in December 1925 issue.

1883 R. C. S., Ferozepore—Mustard oil is not used as base oil in hair oils.

1884 P. L., Ballipadu—Canvassing will be the best profession for you to take.

1885 M. A., Cuddapah—Reply to your enquiries appeared in the last issue under No. 1433.

1887 E. V. U. Bros., Palai—For importing goods from foreign countries you have to approach the firms through some bank. Foreign firms that have branches in India will not make any transaction direct with you. Want to be put in touch with manufacturers of school requisites.

1888. K. U., Nagri.—For secondhand oil engines try Biswakarma Agency 84/A, Clive Street, Calcutta. An article on dry cell battery

appeared in November 1925 issue. Process of preserving milk appeared in June 1924 issue.

1890. I. I. A. Agra.—For waste paper and cloth enquire of Tarafdar & Co, 126A, Amherst Street, Calcutta.

1891. B. B. M. Kaziranga.—Answer to your queries appeared in the last issue under No. 1599. For selling lac you may correspond with J C Galstaun's Shellac Factory, Shambazar and Thomson Lehen & Co, Ltd, 11, Kimber Street, both of Calcutta.

1892 S P K. Poona City.—Blocks are made by Calcutta Fine Art Printing Syndicate 3, Jora Puker Lane and Calcutta Photographic Stores and Agency Co 158, Dharamtala Street, both of Calcutta. For litho printing write to Calcutta Fine Art Cottage, 70, Dharamtala Street, Calcutta.

1893. P T Jodhpur.—For the machine required enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.

1896 J M P F Ganjam.—The treatment of ringworm consists in shaving the parts and keeping it clean with soap and water. A light and nutritious diet should be rigorously adhered to. The following recipe may prove efficacious. Take carbonate of soda, 1 part; fresh slaked lime, 4 parts; powder and put in bottle for use. Dacca Sakti Oushadhalaya, 52/1, Beadon Street, Calcutta; C K Sen & Co Ltd, 29, Colootola Street and N N Sen & Co, Ltd, Lower Chitpur Road, Calcutta, deal in Ayurvedic medicines.

1897. A G Hyderabad.—For dies enquire of Rae & Co, 61A, Madge Road, Calcutta.

1898. D. R., Vizianagram.—For toy aeroplane enquire of K. B. Nan & Co. 233, Old China Bazar Street, Calcutta. For constructing a model aeroplane consult a mechanical engineer.

1901 Y. R. H. Hubli.—We cannot venture opinion about financial status of an individual m.

1905 U E T. E Fagu.—Cardamom major is exported by H Mamooji, 10, Pollock Street and J Ezekiel 13, Chowringhee, both of Calcutta.

1906 M S Y, Tawwi.—Cigarette lighter may be supplied by Calcutta Store, 7/1, Tagore Castle Street, Calcutta and Mahomedbhoy Jivabhoy & Co, Nizam St, Bombay 9.

1907 N S G, Katni.—You may go through Indian Agricultural Journal published by Thacker Spink & Co., 3, Esplanade East Calcutta and Poona Agricultural College Journal, Poona. The following are a few of the journals dealing with dairy industry; Dairy published by J D Hand, 21, Farringdon Avenue, London E C 4; Dairy Man, Cowkeeper and Dairy Man's Journal 13, Great Tower Street, London E C 3, and Dairy World published by W Speaight & Sons Ltd, 98, Fetter Lane, London E C 4. The above journals may be bought of Thacker Spink & Co, 3, Esplanade East, Calcutta.

1909 M G S, Masulipatam.—Your letter has already been replied.

1910 M K R, Karanthattangudi.—We have no such books. For industrial books enquire of Chakraverty Chatterjee & Co Ltd., 15, College Square and Book Co, 4/4A, College Square; both of Calcutta.

1912 S. P. W., Kanauj.—Hardware and metals are imported by E A Currim, 37, Apollo Street, Bombay, R K Motishaw & Co., 11, Humnum Street Fort, Bombay, Abinash Chandra Dutt & Co, Monohar Dass Chowk 208, Harrison Road, Calcutta and K D Chatterjee & Co, 15, Raja Woodcum Street, Calcutta.

1913 A R A, Davanage.—For machinery enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta.



**Cheapest House For
SPORTING GOODS
Silver Medals, Cups &
Shields.**

**Fine Silver Medals in
Velvet lined cases.
Rs. 3-12 each.**

**Largest Stock & Variety
Illustrated Lists Free
CARR & MAHALANOBIS
3/D, Chowringhee, Calcutta**

1914. A. V. A, No Address—For photo lockets enquire of A R Qureshi, Ahmed Lodge, Gujrat

1915 B C Ahmedabad—Glass phials may be bought of Sikri & Co, Post Box No 2287, Calcutta and P S Dutt & Bros, 8, Ezra Street, Calcutta

1916 R G H, Nasik—Refer your enquiry to Hughes & Young Ltd, The Outer Temple, 222, Strand, London W C. 2

1917 P F G, Alwaye—Candle making machines may be supplied by Houchin—Aiken Co, Inc, Brooklyn, New York, U S A. Your other enquiry is not in our line

1919. H P C, Rawalpindi—Recipes of patent articles such as Crescent Balm, Littles Oriental Balm are not known. But receipts of ordinary pain balm appeared in January 1926 issue.

1920 J M N K, Kainigang—Homeopathic patent medicines are not available. Addresses of foreign journals appear elsewhere in these columns

1921 A N N, Guntur—For hair oils you may go through the booklet Hair Oil Manufacture published from this office. For other industrial books you require enquire of Chakraverty Chatterjee & Co Ltd, 15, College Square, Calcutta

1922 D. H. S Karwi—For crop report enquire of the Director of agriculture of your Province. Gunny bags may be supplied by Birkmyre Bros, 6, Clive Row, Bird & Co, Chartered Bank Bldg, Clive Street and Bhagatram Sheopratap, 26/3, Armenian Street, all of Calcutta. Wants to be put in touch with coconut merchants

1923 V. S N M, Chatrapur—Castor Oil may be bought of M M Ispahani & Sons, 51, Ezra Street, Sheo Lal Shankerlal 26/3, Armenian Street and Graham & Co, 9, Clive Street, all of Calcutta

1924 N R S, Benares City—There is no newspaper or journal, published in foreign countries in Hindi. You may consult the following with advantage; South African Review, Cape Town; African Trades Journal

Cape Town and Cape Times, Cape Town; all of South Africa

1925 P S Lahore—In every railway or government workshop age of probationers and apprentices is restricted

1926 K R G, Bana—For books on biscuit manufacture enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta

1927. N K Delhi—For particulars of learning wood carving, etc write to the Principal, Government School of Arts & Crafts, Lucknow

1928. R N C, Agra—For litho hand presses enquire of Ashutosh Addy & Co, 16, Lower Chitpur Road and K Banerjee 8, Canning Street; both of Calcutta

1929 K. M Bagalkot—Process of deodorising castor oil will be found in October 1925 issue

1930 K L, N. Guntur—Tobacco stalks may be used in preparing smoking tobacco. Can supply tobacco stalking large quantities

1933 P D G, Bankura—Mushroom can be avoided by curing tobacco with alcohol. The essential oils mentioned may be had of P. Mukherjee & Co, College St Market, Calcutta. Recipes for preparing the Ottos will be found in the perfumery special number of **Industry** September 1924. Yes, khambua can be prepared from the articles named by a similar process

1934 S M K, Sonpur—For preparing hair dyes according to the formulas quoted by you consult an expert

1937 M L D Chittagong—Chalmooogra is exported by S Stanistreet & Co, Dalhousie Square, Calcutta

1938 B. T, Ajmer—Watches may be supplied by Hermann Konrad, Nenstadt, Germany; Jura Watch Co, Delemont, Switzerland; G. Schaeren & Co, Soleur, Switzerland; Hamilton

BIRTH CONTROL

Advice in an Illustrated Pamphlet
Of 16 Pages containing Hygienic
Practical Methods approved by competent
authorities is sent free on

request to:—

BIRTH CONTROL CENTRE.

At 29-1 Telipara Lane, P. O. Stambazar,
CALCUTTA.

Watch Co., Lancaster, Pennsylvania, U. S. A. Y Hase Jawa & Co., Tamayacho, Nagaya, Japan; K. Hattori & Co. Ltd, Ginza Shichome, Tokyo, Japan; Meyer & Studeli 74, Coleman Street, London E C 2, and Combine Watch Co., 110, Hatton Garden, London E. C. 1.

1939. B N S., Jullundur—For patent registration write to P. Lodge & Co., Post Box No 6772, Calcutta.

1940 R G Sukkur—For the books you require write to the All India Astrological & Astronomical Society 370, Upper Chitpore Road, Jorasanko, Calcutta.

1941 P S R I., Hassan—Process of depositing irridium point at the end of a fountain pen will be found in September 1922 issue

1942 S S L., Cawnpur—For preserving milk you may add a few drops of boric acid to the milk Your other query is unintelligible

1944. G K G., Sylhet—For buying shares enquire of Place Siddon and Gaugh, 1, Commercial Bldg Calcutta

1946 K A S., Moulmee—Wants to buy thin wood for fret work

1947 T S R., Masulipatam—In order to float a Joint Stock Company with shares apply to the Registrar, Joint Stock Companies, Government Place, Calcutta For general rules and regulations you may go through **Commercial India**, the sister journal to **Industry**. Before adding the word Ltd to the name of your firm register it as a Joint Stock Company

1948 M L G., Dhampur—Scents may be bought of Sickri & Co., 554, Canning Street, Calcutta Phials may be bought of the above firm and of S K Dey & Co., 124, Shova Bazar Street, Calcutta. Cardboard boxes may be supplied by H L Seit & Co., 8, Nilmoncy Mitter Street and Kundu & Dass, 20, Gou

Laha Street; both of Calcutta. Coconut oil, til oil and castor oil are mainly used as base oil for hair oil manufacture. For other information go through the booklet *Hair Oil Manufacture* published from this office.

1949 K. R. B., Sholinghur—All the ingredients used in the formula mentioned by you are by parts.

1950 S P G., Calcutta—The immense variety of snuffs depend for their distinguishing characteristic on the length of the fermentation, the fineness of the powder, the height to which they are dried, and the addition of odorous substances. Tonquin beans, essence of tonquin bean, ambergris, musk, civet, powder and essence of orris root and the essences or oils of Bergamot, cedar, cloves, lavender, petit grain nero, and roses (Otto) as well as several others, either alone or compounded, are thus employed. Macouba snuff is imitated by moistening the tobacco with a mixture of treacle and water, and allowing it to ferment well. Yellow snuff is prepared from ordinary pale snuff moistened with a mixture of yellow ochre diffused in water, to which a few spoonfuls of thin mucilage have been added, when dry, the colour that does not adhere to the snuff is separated with a fine sieve

1951 S A A., Plassy—The following are journals on literature (1) Current Literature, 12, Warwick Lane, London E C 4 (2) Plain English, 38, Great Diamond St., London W C (3) Poetry Review, 16 Featherstone Buildings Holborn, London E C 1 (4) Calcutta Review, published by the University of Calcutta. For a list of periodical on Persian literature please write to the Librarian, Imperial Library, Calcutta

1952. R I V Agra—You can approach the cream seller of St Stuart Hogg Market, Calcutta through the Superintendent

1954 B K R Purnea—For stationery you are referred to Dhar Brothers, Harrison Road, and the Students Stores, 30, Jeliatola St. both of Calcutta

1955 P N S., Gujrat—We cannot advertise your patent medicines through these pages

ESSENCES, AND ESSENTIAL OILS

Perfumes, Chemicals and Sundries, etc.

Everything you need for Manufacturing, Hair Oils, Scents, Ottos, Soaps, Perfumed-Waters, Syrups, Udbaths (Scented-Sticks) Zarda Tobacco, Snuffs, Pomades, Hair-Lotions and Perfumery preparations in general; can be had of us at very competent rates. Price list free. Apply to:—D. G. GORE,

31, Mangaldas Road, Market, Bombay No. 2.

1957 H. L. N. Wazirastan—Hints on the preparation of Vinegar appeared in the September issue.

1958 M. H. Razani—You can try the Latent Light Culture, Tinnevely, S. I.

1960 B. J. F. Jobbulporé—For Anglo Hindi or Anglo Urdu Dictionary write to Thacker Spink & Co., Esplanade, Calcutta.

1961 M. L. K. Azamgarh—As will appear from the notice at the heading of these pages, any query within the scope of **Industry** will be replied free of charge in these columns.

1962 R. S. Ajmer—For oil mills you are referred to Burn & Co., Hongkong Bldg, Calcutta who will furnish you estimate.

1963 B. S. G. Gohana—Bristles are exported by Hollingshurst & Co., 5/6, Hare Street and A. H. Wheeler & Co., 117, Park Street, both of Calcutta.

1966 M. M. Rangoon—You should use linseed oil.

1967 H. S. Karwi—There is no commercial dailly in Hindi in Calcutta.

1968 T. P. Madras—Process of preparing lime juice glycerine appeared in April 1926 issue.

1969 G. A. Tichinopoly—Your query being in the nature of an advertisement should not be published in these columns.

1970 K. R. Calcutta—Vide No 1969.

1972 A. S. N. S. Hassan—Wants to be introduced to betel leaf merchants of Jhansi, Ajmer, Gwalior, Surat, Indore, Bhavanagar and Bikaner.

1973 P. V. R. C. Madras—Damik Basu-mati, Bow Bazar Street, Calcutta has large circulation in Calcutta as well as in Mufassil.

1976 N. L. D. Dacca—Your query being in the nature of an advertisement should not be published in these columns.

1977 V. P. S. Ahmedabad—For typewriter ribbon making machines try Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. The machine dealer will also supply you with manufacturing process.

1978 A. K. C. Vizianagram—For books on boot and shoe manufacture enquire of Thacker Spink & Co., 3, Esplanade East, Cal-

cutta. Methylated spirit may be supplied by D. Waldie & Co., 1, British Indian Street, Calcutta. Evan's lime juice glycerine is stocked by Bathgate & Co., Old Court House Street, Calcutta. Calcutta Directory is published by Thacker Spink & Co., 3, Esplanade, Calcutta. Deshopkarak, Amritdhara Bldg, Lahore is a widely-read vernacular paper. For speedy sales of articles manufactured by you advertise in the pages of newspapers and periodicals. Roy & Co., 1, Cornwallis Street, Calcutta stock all sorts of boots and shoes. Cobra boot polish is stocked by Chandra Bros, Bentinck Street, Calcutta.

1981 S. C. I. Karaikudi—A good recipe of fountain pen ink appeared in August 1925, issue of **Industry**. A formula of tooth paste will be found in March 1926, issue. In solidifying oil the process of hydrogenation is applied. Add sufficient water to the lime. Add a few drops of rectified spirit to the curries and chutneys. Core is the heart-wood of a plantain tree when in flower. Engage some washermen who will wash your cloths regularly so that you may deliver them to your customers in time. Woollen and silk cloths should be washed in soapnut solution.

1982 S. B. S. Santipur—Your enquiry being in the nature of an advertisement should not be published in these columns.

1983 M. L. M. Sikkal—For securing service on board a ship you may write to Mackinnon Mackenzie & Co., 16, Strand Road; Kilburn & Co., 4, Fannie Place, Turner Morrison & Co. Ltd, 6, Lyons Range and Macneil & Co., 2, Clive Ghat Street, all of Calcutta. Process of preparing aniline dyes appeared in May 1924 issue. Silk yarn may be supplied by The

THE POLLUTION RING

Is a Scientific German Apparatus very widely known all over the continent of Europe, a safe and certain check and preventative against nocturnal involuntary discharges which are the curse of life and may cause total loss of manhood. Price Rs. 5 plus P. & P. charges As 8 only. Order from—
INTERNATIONAL COMMERCIAL CORPORATION (I. C.),
Batala, Gurdaspur Dist., (Punjab.)

* Giseido & Co., Iwakuni, Kuga-gun, Yamaguchi-ken and The Kuhara Trading Co. Ltd, 14, Nichome Nakanoshima, Kita-ku Osaka; both of Japan.

1985. P. S. N. R., Ellore.—The following is a list of jewellers of Bombay: Premchand Raichand & Co, 425, Javeri Bazar; Manekchand Panachand & Co, 340, Javeri Bazar and D. R. Pundole & Sons, 369/371, Hornby Road

1988 P. P. C., Dindigul.—For industrial books enquire of Chakravartty Chatterjee & Co Ltd, 15, College Square and Thacker Spink & Co, 3, Esplanade East, both of Calcutta. There is no electric light without a battery known to us. Dynamo lights may be supplied by Gadelius & Co, Stockholm, Instrumentfabriks AB, Lyth, Stockholm and Svenska Aktiebolaget Gasaccumulator, Stockholm; all of Sweden. A recipe of silver polish appears elsewhere in this issue.

1989. M. A. K., Basti New.—In opening a shop you have to pay trade licence that should be remitted to the Licence Officer. You cannot send letter at book post rate.

1990 M. N., Rajshahy.—You may go through Darzi Bijan by A. K. Sen Gupta to be had of East Bengal Society, 1, Mirzapur Street, Calcutta. Your second query is not in our line. You may however go through the situation vacant columns of dailies and apply for the posts suitable for you. For prospectus of the Govinda Sundari Ayurvedic College write direct to the Principal. No such school is known to us. For particulars of commercial course write to the Principal Government Commercial Institute, Bow Bazar Street, Calcutta. For particulars of the advertisement write direct to the advertiser.

1992 B. R. G. L., Rusera.—You may insert advertisement in Sale and Exchange pages of **Industry**.

1993 S. M. M., Lonadla.—Tile making machines may be supplied by Manailasini & Co., Mangalore, Kankanady.

1993 N. R. L., Latur.—You may start order supplying business. For this purpose you have to collect addresses of prospective buyers and we think you will be able to collect addresses

from the people who come to work in the ginning factories in season time. As regards methods and procedure you may go through **Mercantile and Mail Order Letters and Methods and Money Making by Mail** by K. M. Banerji published from this office.

1997. A. D. A., Simla.—To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected.

1998 A. R. S. A. N. N., Sivakasi.—An article on cigarette manufacture appeared in September 1920 issue which you may consult with advantage. The address of Imperial Tobacco Co. Ltd, is 5, Fairlie Place, Calcutta. Cigarette boxes, labels, etc may be supplied by Fine Art Cottage, 76, Dharamtala Street, Calcutta. Wants to buy tobacco for cigarette manufacture.

1999 D. P. S., Bareilly.—You may learn motor engineering at The Indian Automobile Institute, 75 & 76, Bentinck Street and French Motor Car Co. Ltd, 234/3, Lower Circular Road; both of Calcutta.

2000 L. G., Araf.—Rice mill plants may be supplied by F. H. Schule G. m. b. H., Hamburg, Germany. Oil engines may be supplied by Antebach & Scheibe AG, Saalfeld 6 and Maschinen Export Heidenreich & Harbeck, Hamburg 33, both of Germany.

2001 M. P. O. N., Balasapatam.—If you go through the New Ideas column regularly you will surely hit upon some business by means of which you can easily earn your livelihood.

2002 K. S. H., Kallai.—Further practical details for growing gardens with gas are not available.

2005 G. M. P., Mandla.—You can have your oils analysed by Mr R. V. Briggs, Lal Bazar, Calcutta.

2006 R. S. S. P., Kotfar.—Television apparatus has not yet been marketed.

2008 T. P. C., Tinnevelly.—Wishes to be put into touch with merchants of Burma, Ceylon and Rangoon who are interested in the purchase of statues and other Catholic requirements.

2009. A. N. D. Balasore.—The following is a list of produce dealers who can supply you wheat and mustard (1) Motimari Scetharamayya P. O. Box 3, Vizianagram (2) Samastipur—Co-operative Association Ltd., Darbhanga (3) Baluk Ram & Co., Dinapur, Cantonment

2014 A. S. M. Bombay.—Miniatures of Taj Mahal may be had of Sharma & Son, Gokulpura, Agra Brasswares may be had of Suriya & Sons, P. B. No. 4, Moradabad.

2015 K. C. M., Benares.—Consult a doctor for your ailments. There is no Indian substitute for Chorotorm which will be as safe in its application

2017 V. C. W., Nizamabad.—For brass and nickel sheets try (1) E. A. Currim, 17, Apollo Street, Fort, Bombay (2) Subol Chundra Dutt & Sons, 208, Harrison Road, Monohardas Chuck, Calcutta. Wants to be put in touch with stag horn suppliers of Delhra Dun and rouge suppliers of Bombay. Your other queries have already been answered

2018 S. S., Muttra.—Ink stains may be removed from paper by a solution of bleaching powder in water applied with a swab.

2019 D. C. R., Tallygunge.—The Bengali equivalents of the words mentioned by you are not known

2020 M. B., Trichinopoly.—Mohun & Co., 2, Jagadish Roy Lane, Durgipara, Calcutta, are manufacturers of window envelopes. Rubber stamp making materials may be supplied by B. K. Dutt, 100, Durga Ch. Mitter Street, Calcutta. The complete address of the firm is not known

2021 S. A. T. Co., Bezwada.—Motor attachment for Bicycles may be had of Alex Brault, 7/1, Wellesley Place, Calcutta. For attache boxes write to W. S. Dossen & Co., College Street Market, Calcutta

2022 A. M. A., Tipperah.—Mohuwa oil for soap making may be had of Mohun & Co., 44, Beadon Row, Calcutta and animal charcoal from Kaylash Churn Dutt & Sons, 20, Bonfields Lane, Calcutta.

2023 D. R. A., Jullundur.—Replies to your queries have already appeared.

2024 L. N. G. Karwi.—To test the suitability of water for boiler purposes you may approach R. V. Briggs, 8, Lall Bazar Street, Calcutta

2025 S. N. M., Shikarpur.—For information regarding technical education in foreign countries please communicate with The Secretary, Association for Advancement of Scientific Education among Indians, Old Post Office, Calcutta

2028 P. C. B., Belgaum.—It would appear that the spots on your looking glass are on the coating in which case you have no other option but to resilver it.

2029 V. C. W., Nizamabad.—See 2017 above. An article on Cane Cultivation will appear in an early issue. Wants to be put in touch with dealers in Swedish Tiles

2030 B. B. B., Calcutta.—The manufacture and export of pickles, chutneys and morabbas appear to have prospect at least in countries neighbouring to India. But the extent of the market has got to be studied particularly with regard to the taste of the customers intended to reach. A minimum capital of Rs. 5,000/- will be a reasonable estimate while the percentage of profit will depend on the scale of the industry

2031 S. N. D., Bikaner.—For hosiery machines and other particulars you are referred to (1) M. Hindaynaram, 32, La Touche Road, Calcutta; (2) W. H. Brady, 24, Strand Road, Calcutta, (3) Indo Swiss Trading Co., 27, Pollock Street, Calcutta.

2032 D. S. R., Rajahmundry.—If you want to prospect for mines you can study books on geology to be had of Chuckervertty Chatterjee & Co. Ltd., College Square, Calcutta.

2033 S. G. C., Agra.—Wants to be put in touch with a Harmonium manufacturer of Punjab

2034 B. R. N., Gotan Marwar.—"Pandi" is not understood. Addresses of manufacturers of pictorial rings in France are not available. A recipe for mosquito oil appeared in the July 1924.

NOTICES & REVIEWS

A Science Journal.

"Science and Invention" published by the Experimenter Publishing Co., Inc., New York, thoroughly covers every important and interesting event of the scientific or inventive world. All the latest developments in applied science, mechanics, magic, etc. are elaborately dealt with and profusely illustrated. For particulars apply to the sole representative, Messrs. Ramsankar & Co., Kottar, Travancore.

Book on Astrology.

Practical Instructions in Astrology. By Dayaldas T. Khilnani. Published by The T. G. Khilnani Home Library, P. O. Dharia, Sind, Pp 16, Price As. 5 only. The elementary principles of astrology are simply put forth in this first primer.

Sex at Birth.

Production of Boy or Girl at will by J. D. Narulla, Hawaii College of Business, Rawalpindi, Punjab.

The little book deals with the causation of sex, the determination of sex and the production of either sex at will.

A New Weekly.

The Himalayan Times, Exchange Building, Dehra Dun, (U. P.). It is a weekly journal devoted to the discussion of all topics of interest, special stress being laid on constructive side of every thought and movement with a view to consolidate Indian Nationalism.

Industrial Colony Scheme.

In the course of a series of articles contributed to "Capital" Capt. J. W. Petavel, has made some plausible suggestions for the inauguration of industrial colonies. The indefatigable Captain is widely known as the sponsor of the educational colony movement whereby he hopes to solve the unemployment problem in India. In his present scheme senior boys, from all the latter colonies with an industrial bent

would go to the former and take part in the manufacture of articles used in the villages that can be produced on a small scale—soap, matches, leather for instance. Those working in the rural educational colonies would be able to get soap, matches, or shoes for their credit, and conversely those helping to manufacture the articles would be able to get for their credit the seed wheat or seed paddy, in their villages. Thus, he explains, that the educational colony, is of great interest from the point of view of small industrial development in India. Readers interested in the development of the scheme should write to the Editor, Bread & Freedom, 22, Shambazar Bridge Road, Calcutta.

Blood Purifier.

We desire to draw our readers' attention to Mahamita Sarsa and Swastha Sanchar, the two specifics for blood-impurity and genito-urinary diseases, prepared by Kaviyaji L. M. Roy, B. A., Bidyandhar of 7, Santi Ghose Street, Calcutta.

A Famous Tonic.

Budhiraja's Ferri Syrup Compound is a successful remedy for enlarged spleen and other malarial diseases. It is also an excellent tonic. Further particulars may be obtained from Budhiraja Medical Hall, Miani, Shahpur, Punjab.

Snuff Case.

The snuff case sent to us by Mr. S. A. Chinnappah, Etayappuram, South India, is made of real horn and is very attractively finished.

Coat Hangers.

The coat hangers turned out by The Javliker Industrial Works, Tirthahalli are at once decent and cheap. Being made of brass they are stronger than wood and will not rust. We wish the products wide sale.

A German Novelty.

The moving photos imported by German Agency, 110, Kalla Street, Trichinopoly, form a

very pleasing novelty which amuses both children and old men.

A Delightful Music.

Messrs J Rangel & Co, established in Portuguese India have edited one beautiful composition for the piano, entitled Les Ballets du Concan—whose author is the Portuguese Barrister-at-law—Cards Engenio Ferreila, distinct pianist and writer. The little song pieces in the volume have been arranged for the pianoforte with a view to giving delight to all and preserve faithfully the freshness of the originals.

A Pocket Calendar.

The Gita Rahasya Calendar published by Messrs. Tilak Bros, Gaiikwar Wada, Poona City, possesses several unique features. It contains tri-colour pictures, and quotations and mottoes. The idea is good.

Medicine and Milk Tablet.

We have received from Messrs T Ponniah & Company, Panakudi, Tinnevelly Dist., Vadakangulam P O, a sample of tonic prepared from fruit juice. It resembles jelly in its nature and taste; and at the same time it is a remedy for dysentery, piles, etc. They are also making milk tablets.

Ringworm Ointment.

Our readers may give a trial to the ringworm ointment made by The Universal Goods Trading & Mfg Co, Baran, Kotah.

Remedy for Gout.

"Anodon" is the name of a remedy for rheumatism, gout, sciatica and indeed for any sort of pain. It is the product of Dr Roy's Research Home 8, Santiram Ghose Street, Shambazar, Calcutta.

TRADE ENQUIRIES.

[To communicate with any party write him direct with name and address given below, mentioning **Industry**.]

2050 Kandukoory V Subha Row, Ellore—Wants to be introduced to dealers in genuine musk, momai, bitumen, pearls and corals.

2082 Mundla Venkata Subha Reddi, Cuddapah—Desires to be put in touch with indigo merchants of Multan, Punjab and other chief towns of India.

2091 Sarkar Bros. & Co., Dompara Lane, Purulia—Want a capitalist with Rs 500 to Rs 1,000/- to invest in a profitable business.

2092. R. C. Swamy, Kharsia—Wishes to be introduced to fowl, kid and goat merchants.

2115. Commercial Bank, Trichur.—Desire to be put in touch with rubber merchants.

2132. Tarak Ch. Ghose, Bansai, Konnagar.—Wants services of an expert who can help in manufacturing essences and toilet waters and aqua ptychosis.

2153. B. R. Bhattacharjee Bheramarah, E. B Ry—Can supply betel leaves in very large quantities.

2196. Motilal Damodardass, Dwarkadish Mandir, Muttra—Desires to be introduced to peacock feather merchants.

2209 B B Mojumdar, Kohora Busty, Kaziranga, Sibsagar—A young man with 200 acres of land wants a capitalist to invest Rs 60,000/- to start cotton and lac cultivation.

2301 V S Sarkies, 5, Keshla Lane, Ashar, Basrah—Can supply hard natural bitumen.

2329 Shram Bihari, Kayasthana Road, Mahal, Cawnpore—Wants to be put in touch with importers of platinum articles such as wire, plates, dishes and crucible.

2340 S Goyal & Co., Kiraoli, Agra—Can supply bristles and skins of lizard.

NOVEMBER ISSUE OF INDUSTRY.

(In the Press.)

The November issue of **Industry** which will appear on the last day of the month will contain among others an illustrated article on Candle Making in addition to the regular features such as India's Industrial Progress, Scientific Topics, Small Trades and Recipes, etc. Any friend of our subscribers may get a copy free as sample on application to the Manager, **Industry**, Shambazar, Calcutta.

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Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows.—

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The charge is for complete yearly volume only, inclusive of postage V P. and Registration fees are separately charged.

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Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V P P only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt rate please write to—

Manager **INDUSTRY OFFICE**,
Shambazar, Calcutta.

IF YOU WISH TO IMPROVE YOUR

ENGLISH**DO AS I ASK YOU TO DO:**

Take your pen Cut out a sheet from your writing pad Write on it your full name and address If you are living in a village, be sure you add the district as well If you have in view any Commercial or University Examination, mention it Give me some idea of what you are and what you wish to be Omit nothing that may be of help to me in planning a special course to meet your needs Address the envelope thus:

To, The Director,

THE SCHOOL OF ENGLISH,

POST BOX NO. 20, G. P. O. POONA.

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1. **Control over Birth (Illustrated)** gives harmless and infallible methods of preventing conception. Acknowledged to be the most practical book on the subject. As. -[12]-.

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Rs. 2/- only for the complete set.
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THE MIRACLE OF THE AGE.**THE MOST EFFECTIVE TALISMAN FOR ADVERSE PLANETARY INFLUENCES.**

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most wonderfully effective "Kavachas"
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For turning unfavourable stars favourable, ensuring rapid promotion in service, freeing from debts, obtaining desired object, cure of disease, overpowering enemies, enjoying cheerfulness, regaining lost trade, earning enormous wealth, increase of conjugal love, becoming blessed with children in case he or she be sterile or barren and thus the line is saved from extinction. Price Rs. 13[11]-.

To be had of:—BHAGYA GANANA KARJYALAYA,**29, JHAMAPUKER LANE, CALCUTTA.**

To all Ambitious men

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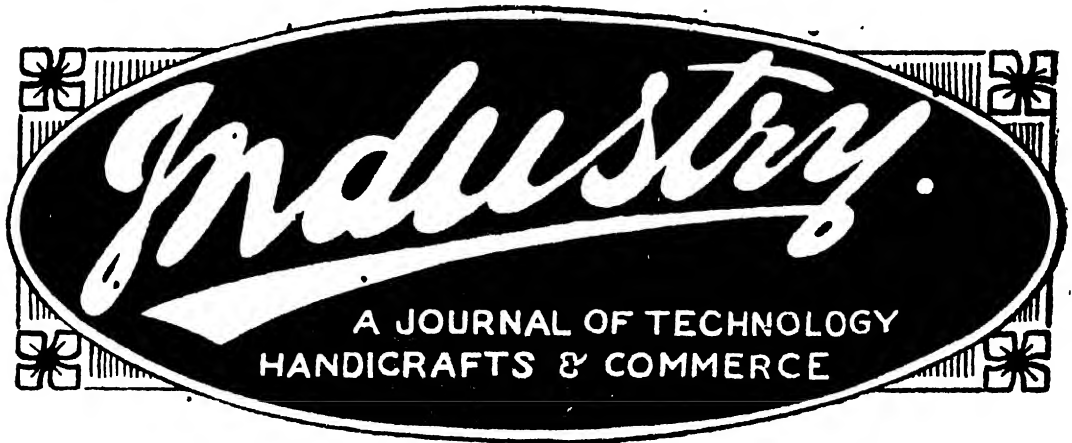
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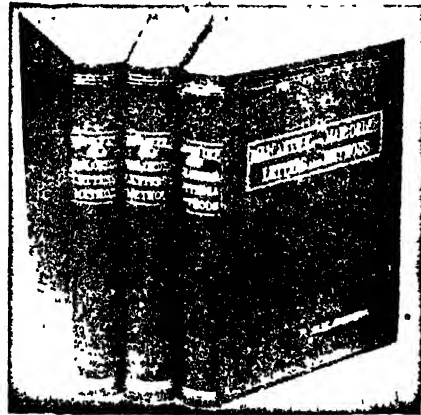
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VOL. XVII.

CALCUTTA, NOVEMBER, 1926.

NO. 200.

THE PRODUCTIVITY OF MAN.

PRODUCTION means to bring forward, to increase, to develop. In economics, it means to cause any article to have an exchangeable value. Production is the first and one of the strongest inborn impulses of humanity.

Every man, through thought and effort, in some way ought to produce at least enough to meet the requirements of his own responsibilities. Nature has not made any provision for drones in the human beehive. To do his full duty man cannot escape sweating. The more a man produces the more valuable he is to his fellows. His surplus production is for the use of others. It also adds to his own comfort and well-being. Therefore, energetic, persistent and intelligent production is the basis of comfort, contentment and happiness.

Where a man's production does not fully equal his consumption, he disturbs Nature's balance. He must give back to the world at least as much as he takes out of it.

The productive activity of man, no less than life on a basis of law, seems to be peculiarly a product of society. Only a few have realised how much they rely on the widely extended co-operation of society in the ordinary provision for the

daily needs of life. In a highly developed state of civilisation, for instance among the population of a capital, it is an unimportant exception for one man out of the hundreds of thousands who labour and produce daily, to apply any at all considerable part of what he produces to the satisfaction of his own wants. He gives almost all he produces to the community, and takes almost all he requires from it in other goods. And the whole of this thousandfold exchange, of which money and credit are the powerful promoters, goes on, as a rule, smoothly and noiselessly, and, not in consequence of legal ordinances, nor in consequence of sentimental love of one's neighbour, but entirely through the force of well-calculated egoism. Human society attains its highest triumph in the economic re-arrangements of life, here it shows itself in the plainest way as possessing a capacity for production, contrasted with which isolated human existence seems like mere impotence. Without the co-operation of society the very strongest man—the man who is most richly endowed with external aids to existence and action is powerless. In the social state, the poorest man may have at his disposal by the most insignificant expenditure numberless men and natural forces.

MANUFACTURE OF CANDLE.

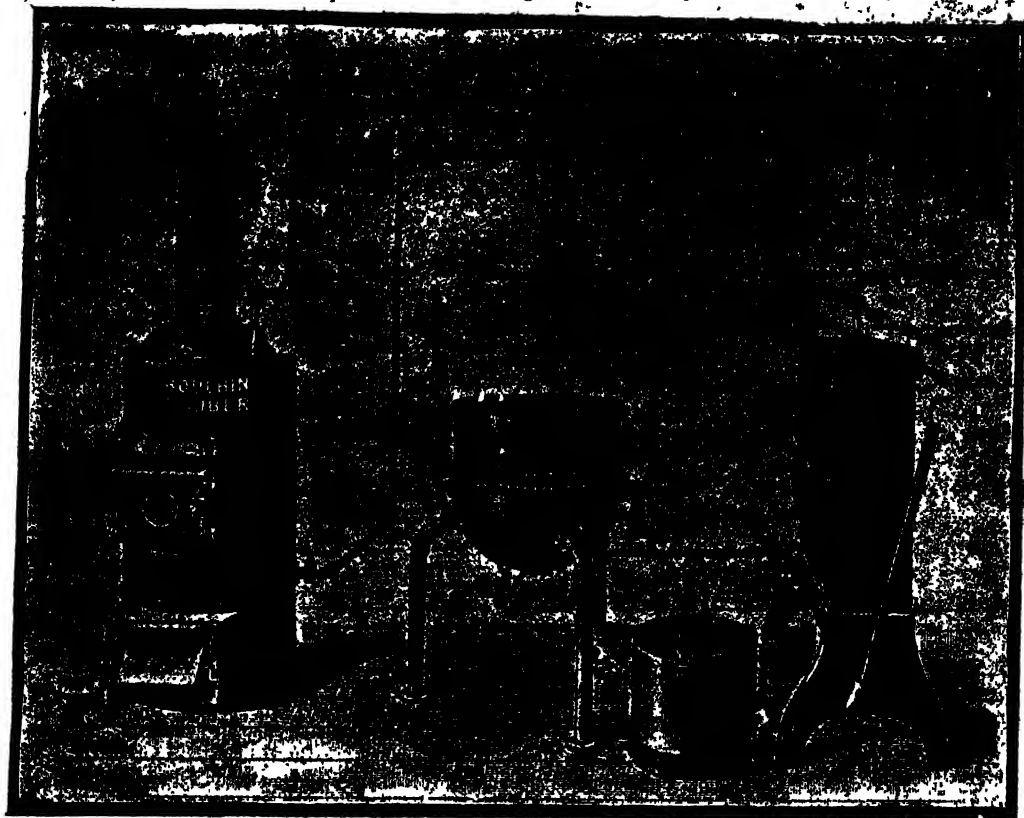


Fig. 1. Modern Candle Plant.

IT is necessary for the proper understanding of some of the details of candle-making to enter briefly into the chemistry of fats and oils. Most fats and fixed oils, vegetable and animal, are mixtures of two compounds each of which taken singly has all the properties of fats.

The first of these substances, called "stearine" is solid at common temperatures, it constitutes the solid fatty ingredient in mutton-tallow, the second is oleine, and is liquid at ordinary temperatures. All fats may therefore be

regarded as mixtures of the fluid oleine with the solid stearine. If the solid be in larger proportion than the fluid, as in various kinds of tallow it requires a greater degree of heat to melt it. If the fluid proportion prevails as in the oils, the melting point is lowered.

Each of these substances contains an organic base or substance capable of uniting with acids to form (in most cases) a neutral compound. This base is named "glycerine" and is united with an unctuous substance which has acid properties. The glycerine is common

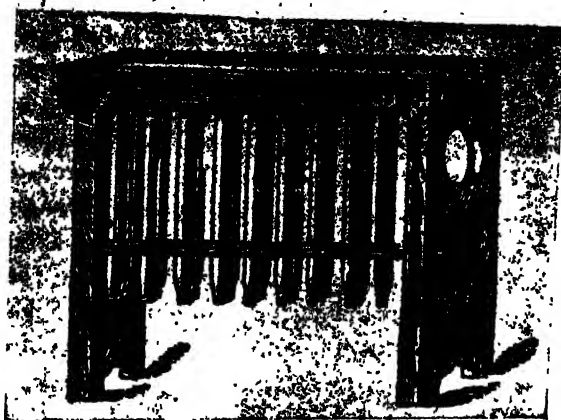


Fig. 2. Hand Candle Mould.

to all fatty principles but the acid in each has its own peculiar characters. Thus, the acid in "oleine" is named "oleic acid," which combines with glycerine to form oleate of glycerine. So also the acid of stearine is called "stearic acid" which in combination with glycerine forms stearate of glycerine.

All these fatty compounds are decomposed by free alkalies, such as potash and soda; their acids quitting the glycerine to unite with the alkalies, forming a soluble soap while the glycerine is left behind in the mother liquor. The hard soaps of commerce when made with oils and fats are chiefly mixtures of oleate and stearate of soda.

The chief material used in making candles is tallow. This substance is the concrete fat of oxen, sheep, goats and other large quadrupeds separated from the fibrous matter which accompanies it. There are two principal varieties of tallow, arranged according to their purity and consistence into candle and soap tallow. It is generally sufficiently

pure for soap making without previous preparation.

Candles are also made in very great numbers from palm oil. This substance is obtained from the West Coast of Africa. It contains about two-thirds of its weight of a peculiar white solid fat, 'palmitine' the remainder consisting chiefly of oleine.

Such are the chief materials used in the manufacture of candles. Ordinary candles are

made of tallow, and are either dipped or moulded. Mutton suet with a proportion of ox-tallow is used for mould candles, which are required to be hard and to have a glossy surface. Coarse tallow is used for dips. The first operation in candle-making is to sort and melt the tallow, and this should be done as soon as possible after the fat has been removed from the carcass, because the fibrous and fleshy substances mixed with it promote putrefaction. The tallow is usually melted in an open copper exposed to the direct action of the fire, and after fusing for a considerable time the membranous matters collect at the surface.

These are removed and the melted tallow is passed through a sieve into another copper, where it is washed with a quantity of boiling water. The impurities settle down with the water at the bottom of the copper, and the purified tallow is lifted out in buckets of tinned iron into tubs, where it cools and is ready for use.

In the method adopted in Europe for extracting the fatty matters from the

cells or tissues in which they are confined, the direct action of fire is not employed, but the simple agency of steam combined with dilute sulphuric acid. The fatty matter is left to macerate for a day or two with very weak sulphuric acid, after which about 400 lbs. are taken out of the macerating tubs, and put with 24 gallons of water and 7 lbs. of acid into proper wooden vessels, where the mixture is subjected to a jet of steam, which soon causes the whole to boil. Under the influence of heat of the weak acid, the nitrogenated tissue which envelopes the grease is rapidly destroyed, and liberated fatty matter floats on the surface of the boiling water perfectly free from all foreign matters; after which the jet of steam is stopped, and the tallow is let off by a tap into a proper receiver. The simple addition of a little acid reprepared the melting vessels to receive a new charge of macerated fat, which also becomes fit for letting off after a short time.

The wicks used for the best candles are cotton rovings of a special kind. Four or more skeins according to the thickness of the wick, are wound off at one time into bottoms or clues, and afterwards cut to the proper lengths, being first doubled and twisted so as to leave a loop at one end. Wicks for dip candles are also cut very expeditiously by machinery. Balls of cotton previously made into a loose roving or cord, consisting of a dozen or more threads each, and differing in thickness according to the size of the candles, are put into a box or drawer. The ends are then attached to a rod or broach, and equal lengths of cotton are cut off by

drawing a knife along a whole range of them at once, a slight twist being given by action of the machine. When the wicks are cut to the proper length they are dipped into melted tallow and rubbed between the palms of the hands; and on being left to harden they are arranged upon smooth sticks or broaches about half an inch in diameter and three feet long, for the purpose of dipping. The dipping-room contains a boiler for

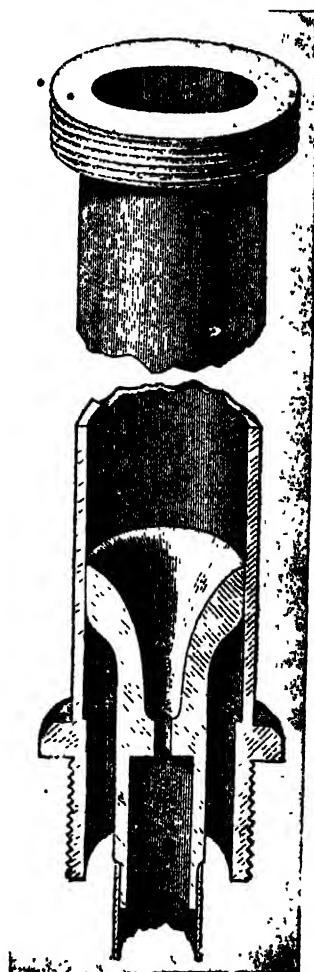


Fig. 3. Single Candle Mould.

melting the tallow, a dipping-mould or cistern, and a large wheel for supporting the broaches. A long balance-shaped beam is suspended from the ceiling to one end of which is attached a wooden frame for holding the broaches with the wicks properly arranged. The opposite end of the beam has a scale pan with weights to counter-balance the wooden frame and to enable the work-man to determine the size of the candles. The end of the lever which supports the frame is situated just above the dipping-cistern, so that by gently pressing down the balanced beam, the wicks descend into the melted tallow and which is kept in a proper state of fluidity by a bath of hot water on the outside. The wicks are dipped three times for the first lay, and after being kept a short time over the cistern for the wicks to drain, the sticks are placed rack and the candles are left to harden. The same process is repeated a second and a third time, or oftener, according to the required weight of the candles, a sufficient time being allowed between

each dipping for the tallow to consolidate: hence the dipping room requires to be kept cool.

Various machines for dipping candles have been introduced. A typical machine consists essentially of a strong upright post, turning upon pivots, and supporting a wheel with 12 horizontal arms, from the end of each of which is a frame or post containing 6 rods, on each of which are 18 wicks, making altogether 1296 wicks. On turning the wheel round, each post is brought in succession over the dipping-mould, and the wicks receive a fresh coating. The constant motion through the air tends to consolidate the tallow.

The moulds used in making mould candles are of pewter, and consist of two parts; namely, a hollow cylinder of the length of the candle open at both ends, and nicely polished on the inside, and a small metallic conical cap with a hole in the centre for the wick. Glass moulds have also been lately introduced. 8 or 12 of these moulds are fixed in a wooden

frame, the upper part of which is a trough, into which the open extremities of the moulds are inserted on a level with its surface, so that the tops of the moulds point downwards. In order to insert the wicks the frame is placed on its side, and the worker introduces a hooked wire into the mould, and passing it out through the point at the top attaches to it the loop of a wick, a number of which he holds in



Fig. 4. Steel Cutter and Scrape.



Fig. 5. Candles of Different Shapes and Sizes.

his left hand, he then draws back the wire and brings the wick along with it. All the moulds being thus provided, the assistant passes a small wire through the loop of each wick, for the purpose of keeping it stretched in the centre, or along the axis of the cylinder. The moulds are filled by running tallow into the trough from a boiler kept at the proper temperature, and furnished with a cock or tap. When the moulds are almost half filled the supply of tallow is cut off, and the work-man laying hold of the portion of each wick that projects from the point pulls it tight. This prevents the wick from curling, and secures it in its proper position. The filling is then completed and the frame put aside to cool. The candles ought to remain in the moulds until the next day, but it is known when they are properly set by a snapping noise produced by pressing the thumb against the bottom of the moulds. When this occurs the wires are pulled out, the superfluous tallow is scraped off with a small wooden spade; a bodkin is introduced into the loop of the wicks, and the candles are withdrawn in succession. They are then

removed to the store house, where in the course of a few months they become sufficiently white.

Wax is not adapted for moulding, in consequence of the contraction which it undergoes, on cooling, and the tenacity with which it adheres to the sides of the moulds. Wax candles are made in the following manner.

A set of wicks properly cut and twisted and warmed at a stove, are attached to a ring of wood or metal, and suspended over a basin of melted wax, which is taken up by a large ladle and poured on the tops of the wicks, each wick being kept constantly twisted round its axis by the fingers; the wax in running down adheres to the wicks, and completely covers them. This process is repeated at intervals until a sufficient thickness is attained. The candles are then rolled while hot with a flat surface of box-wood upon a smooth table of walnut-wood kept constantly wet; this makes them truly cylindrical. This basting, twisting of the wicks and rolling is sometimes repeated two or three times before the candles are finished, but a skilful work-man will cover the wicks with the proper quantity of wax without taking them down.

Considerable improvements have been made of late years in the manufacture of candles, by decomposing the fatty or oily substances used for the purpose, and employing the stearine or palmitine only.

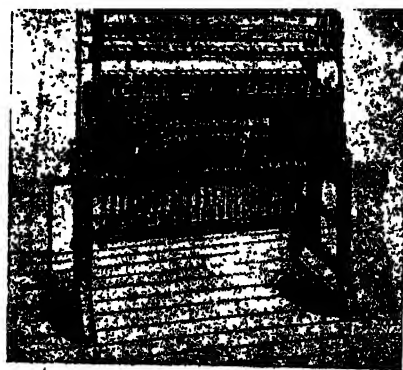


Fig. 6. Improved Candle Machine.

THE HANDICRAFT OF CARPENTRY.

CARPENTRY is the art of combining pieces of timber to support a weight or sustain pressure. The work of the carpenter is intended to give stability to a structure; that of the joiner is applied to finishing and decoration. The scientific principles of carpentry are founded on the doctrines of the composition and resolution of mechanical forces, and a knowledge of these doctrines, either theoretical or practical, is indispensable to the skilled carpenter. To go into the principles of the art would be merely to explain a particular application of these mechanical forces, which would be beyond the scope and limits of this article. An explanation of the terms employed in carpentry may, however, be useful to the general reader. The term frame is applied to any assemblage of pieces of timber in a frame are called joints. Lengthening a beam is uniting pieces of timber into one length by joining their extremities. When neatness is not required this is done by fishing. In this mode the ends of the beams are abutted together and a piece of timber placed on each side and secured by bolts passed through the whole. Sometimes the parts are indented together and pieces termed keys are notched into the beams and side pieces. When it is desirable to maintain the same depth and width throughout the beam scarfing is employed. This is cutting from each beam a part of the thickness of the timber, of the length of the intended joint, and on opposite sides, so that the pieces may be jointed together, and bolted or hooped. In bolting scarfs side plates of iron are

used to protect the wood when greater strength is required than can be produced by a single beam. *Building* and *trussing* beams are resorted to. Building beams is combining two or more beams in depth so as to have the effect of one. In trussing the beam is cut in two in the direction of its length and supported with cross beams, as in roofing. *Mortise and tenon* is a mode of joining timber. An excavation called the mortise is made in one piece, and a projecting tongue to fit it called the tenon in the other. The tenon is confined in the mortise by a pin penetrating it laterally through the side of the mortised beam, or by an external strap of iron passing round the mortise in the beam and rivetted in the one terminating in the tenon. The timber frame work of floors is called *naked flooring*. It is of three kinds—single, double and framed. Single flooring consists of a series of joists stretching across the whole void from wall to wall without an intermediate support. The flooring boards are laid on the top of these and the ceiling of the lower story fixed to the underside. Double flooring consists in laying binding joists across the floor about 6 feet apart, crossed above by bridging joists, and also crossed below by the ceiling joists. Framed flooring is provided with girders or beams in addition to the binding, bridging and ceiling joists. To prevent the transmission of sound a double ceiling of lath and plaster is sometimes used but generally pugging is inserted between the roof and the ceiling. This is called *deafening*. *Cornice breaking* consists in rough wooden profiles of the room cornices, which are afterwards

lathed round and plastered. Partitions when not required to bear weight, are formed by laying along the floor a piece of timber called a *sill*, together with a corresponding piece along the ceiling joists, the space within being filled with vertical pieces called *quarters*, to which the lath is nailed. When the partition has weight to support it has to be trusted with posts and braces. The timbers which support the steps of a wooden staircase are termed the *carriage*. They consist of two pieces of timber inclined to the *rake*, or projection of the steps, and termed *rough strings*, which may rest upon a piece of timber projected horizontally from the upper wall called a *pitching* or apron piece, which also supports the joists of the landing or *half pace*. The roof is the frame-work by which the covering of a building is supported. It may consist of a series of pieces of timber with their one ends resting on the opposite walls, and their other ends meeting in a point, which are called rafters. When loaded with the weight of the covering this frame-work would be apt to thrust out of the roof; a third piece is consequently added, which, like a string connects the lower extremities of the rafters, and prevents them from spreading. This is called a *tie*, and the whole frame a couple. When the tie is of such a length that it is apt to droop in the middle, or sag, by its own weight, a fourth piece is added to unite it directly with the apex of the rafters, this is called the *king-post*. If the rafters too are liable to sag, cross pieces called *struts* are introduced, uniting their centres with the centre of the tie. Instead of the king-

posts and struts the centre of each rafter may be joined to the tie by a piece falling perpendicularly on the latter, and to each other by a piece running across, parallel to and above the tie, forming a parallelogram with the perpendiculars and the section of the tie inclosed by them. The suspending pieces are called *queen-posts* and the horizontal one a *collar beam*. The whole frame, constructed in either way, is called a *truss*. The trussed frames are placed at intervals of about 18 feet apart, and support horizontal pieces called purlins which run the whole length of the roof, and support the common rafters with their covering.

THE ART OF DYEING.

DYEING is the art of staining or colouring yarn or cloth. It has been practised among the oriental nations from time immemorial. Gradually, the art of dyeing spread widely as civilization advanced.

If the various colouring matters used in dyeing had an affinity for the fibre in its natural state, the process would be very simple. It would only be necessary to make a solution of the dye and immerse the goods to insure their being dyed. But so far from this being the case, if we except indigo and safflower, there is scarcely a dyestuff that imparts its colour to goods. The greater part of the dyestuffs have so weak an affinity, for cotton goods especially, that they impart no colour sufficiently permanent to deserve the name of a dye.

This primary want of affinity makes dyeing sufficiently intricate and renders it more dependent upon science. When the dyer finds there is no affinity between the goods and any colouring substance he endeavours to find a third substance which has mutual attraction for both. This third substance used is termed a mordant.

All the mordants with one or two exceptions are found among the metallic oxides. In order that a substance may act as a mordant, it must possess certain properties. It must have an attraction for the colouring matter so as to form with it an insoluble coloured compound and it must be held in solution. The bases or oxides, which are in general use as mordants, and which appear to succeed best are alumina and the oxides of tin and iron. The principal part of all dyeing operations is the proper choice and application of mordants. A very little alteration in the strength or quality of a mordant causes a decided alteration in the shade of colour. However, it gives the dyer a much wider field for variety of shades, and, at the same time, a less number of colour substances are required. Mordants which are insoluble by themselves, should be dissolved in suitable solvents.

It is with the vegetable colouring matters that the greatest attention must be paid to the many conditions and properties of mordants. Bichromate of potash, alum and oxalic acid, as mordant on wool, produce with logwood a very fine navy blue, but one that is not very

fast to light. Sulphate of copper is used largely as a mordant with logwood for making black on cotton. These mordants are used almost exclusively for the wool dyes.

In dyeing wool either raw, woven, or as yarn, care has to be taken that the wool is thoroughly free from grease before being mordanted. This is done by passing it through either soap, soda, or soda ash, and then thoroughly rinsing to free it from the alkali solution. If this is not done, unevenness in the dyeing is caused as well as a rubbing off the colour. When the dyer is given a shade to match he has to take into consideration the amount of fastness required, as where goods have to be heavily fulled, unless the colours are sufficiently fast, they will full out and be spoiled. In this case only such dyes can be used as will stand this process. The quantity of dye to be used depends on the class of wool to be dyed, as the finer the quality of the wool, the more dyestuff it takes to produce the same shade. The dyer also has to study to produce the result at the lowest possible cost, both for labour and dyestuff.

The dyeing of cotton is a fixation of the colour in the pores of the cotton. Cotton is dyed in the raw state, pieces, and yarns, and the amount of dye used to produce a given shade also varies somewhat according to the quality of the staple. In using colours requiring a mordant, sumac and antimony are used, and the amount employed is governed by the depth of the shade required.

THE IMPORTANCE OF NITROGEN COMPOUNDS.

THE purport of this essay is to convey to the general reader the importance of nitrogen compounds in modern industry. Inorganic compounds of nitrogen are made use of in abundance in agriculture; organic compounds are used as explosives, dyes and drugs.

Let us now consider what are those compounds of nitrogen which are of industrial importance. The nitrates of sodium and potassium (commonly known as Chile salt-petre and nitre), certain ammonium compounds, organic compounds called "guncotton," "nitro-glycerine," picric acid, aniline, indigo, antipyrine and a few alkaloids are the numerous outstanding substances.

Nitrogen is a necessary food-stuff of plants and the plants take this mainly from the soil which naturally contains combined nitrogen in the form of nitrates. After some years the land gradually becomes unproductive due to loss of these compounds. Therefore these nitrates and certain ammonium compounds are supplied to the plants in the form of artificial manures or "fertilizers." The nitrogen fertilizers are sodium nitrate, calcium nitrate, which is commercially manufactured under the name of 'air salt-petre,' ammonium sulphate, guano (excreta of sea birds), calcium cyanamide or 'nitro-lime' of commerce and the nitrates from bacterial decomposition. The use of fertilizers is realised from the following statistics: The wheat crop per acre which is the average of ten continuous years is:—Denmark, 40 bushels; Great Britain 33; Germany 29; and United States 14. "Guncotton" and "nitro-

glycerine" are powerful explosives and their manufacture in recent times has been a commercial success. Guncotton, which is not completely "nitrated," after treatment with camphor and alcohol and evaporations of the latter yields that transparent substance going by the name of "Celluloid." It is used in making photographic films and in many other minor industries. A form of "artificial silk" is made from 'colloidon,' a solution of guncotton in ether and alcohol.

Indigo is the well-known colouring matter. Aniline which is the important constituent in the manufacture of the so-called "coal-tar" colours is used in dyeing industry one of the greatest present-day industries. Organic bodies of this type are known as "amines" which are strongly basic. The formation of the dye consists in the production of a salt by neutralization of the base by means of an acid. Aniline dyes are prepared having any desired shade or tint and they are extensively utilised for the dyeing of fabrics, cosmetics and soaps now-a-days.

The compound antipyrine and the alkaloids (quinine etc.) are drugs. The former is in considerable demand for it is used in remedying such ailments as neuralgia. Quinine, a very powerful drug is a remarkable alkaloid obtained from cinchona bark. Its curative effects in some fevers, its use as a tonic and its application in skin diseases of the type of "eczema" have made it very prominent in modern medical treatment. In this connection the name of 'morphia,' might be mentioned. It is an opium extract and is a highly useful drug for certain acute ailments in which case a hypodermic injection is usually done.

—By Mr. R. Venkatramanan,

PRESERVING FRUITS BY REFRIGERATION.

THE use of cold storage as a means of preserving fruit and vegetables is known in most parts of the world, but it has, except in the case of bananas, not been applied extensively for the preservation of the usual tropical fruits, and particularly of the mango. And yet there are few cases in which, if applicable at all, it would be of great value. Many of the tropical fruits, and again particularly the mango, become ripe in a very restricted period, and a period when there is a glut in the market and a correspondingly low price, is rapidly followed each year by a time when there are no fruits to get and the price is very high.

Though much information is available as to the conditions under which semitropical fruits can best be kept in cold storage, yet few data are available in connection with the fruits dealt with in the present paper. As regards mango, one authority states that he was able to preserve the fruit for 31 days at 34 to 40° F., and another reports that experiments in shipping mangoes from Australia at a temperature of 35° F. were satisfactory.

The experiments recorded in the present paper were made at the cold store in the Crawford Market, Bombay. The range of fluctuation of temperature in this cold store is much greater than is desirable, but is unavoidable when it has to be frequently opened to bring in and take out materials kept on a commercial scale. The records have been made during the three seasons of 1923, 1924 and 1925.

MANGO. Two varieties of mangoes were used in the experiments, namely, Alphonso and Pairi, two of the best types in India. The former keeps much better than the latter, but, for both, a steady temperature of 39° F. to 40° F. was found suitable. At this temperature, mature and green Alphonso mangoes can be kept for a month without deterioration. Tightly packed fruit wrapped in tissue paper kept longer and better than loosely packed and unwrapped fruit. This suggests that even a somewhat higher temperature than that named would suit the fruit quite well. As a matter of fact a rise in temperature to any point between 40° and 50° F. did no harm to the stored fruit.

A sudden fall in the temperature below 36° F. told at once seriously on the fruit. The skin became immediately spotted, in the form of small scattered depressions all over the skin of the fruit. When the temperature was reduced to 25° F. the skin of the fruit was softened, but the damage did not go further when the temperature was raised above 40° F. and ranged between 45° F. and 50° F.

A sudden fall in the temperature did not affect the pulp of the fruit nearly so much as the appearance of the skin. Spotted fruits, in fact, when taken out of store after 20 days, ripened well from within, and the taste was almost as good as that of fresh fruits. The low temperature affects ripe or half-ripened fruits more seriously than green mangoes.

Green Alphonso mangoes which had been in the cold store between 36° F. to 40° F. for a month took six days to ripen

after, withdrawal, as good, in fact, as naturally ripened mangoes.

CHIKU (ACHRAS SAPOTA) OR SAPO-DILLA PLUM. This fruit, which is a great favourite in Bombay, when green, resists temperatures below 40° F. better than any of the others tested. The skin does not become pitted like that of the mango by a low temperature. Frequent fluctuations, however, below 40° F. make the fruit very hard and it ripens very unevenly when removed from cold storage. Between 40° F. and 50° F., green chikus could be kept for a month, and then ripen normally when removed from the cold store.

BANANA. Green bananas of the principal varieties cultivated round Bombay—Rajapuri, Sonkel, and Red Bassein—could be kept without change of colour at a steady and uniform temperature of 40° F. and could be normally ripened after removal from cold storage.

Fluctuations in the temperature below 40° F. affected the green fruits and gave them a smoky colour. The yellow and ripened fruits became softer and darker. When the temperature fluctuated between 40° and 50° F. the bananas, either green or ripe, were not affected.

Ripe but firm fruits were also successfully kept at a steady temperature of 45° F., but the skin became darker in colour. Ripe bananas when wrapped in paper showed their original freshness on removal from the cold store, but unwrapped fruits lost their lustre and became dull.

Green bananas kept in the thawing room, with a temperature ranging between 55° F. to 60° F., changed colour from green to greenish yellow within seven days. These greenish yellow bananas kept quite well in the cold store at 40° F. to 43° F. for 15 days with repeated (three times) fall of temperature to 30° F. and equally gradual rise again to 42° F. The colour of the skin was, however, darkened by this treatment.

PAPAYA. The papaya fruit does not seem to keep well under the conditions of temperature available in the cold store. It remained good for a fortnight at temperatures above 40° F., but on removal from the store, it did not ripen evenly, and the ripened fruit presented firm flesh in places while in other parts the papaya was soft. The colour of the flesh was quite similar to that ripened in the ordinary way outside the store.

—THE AGRICULTURAL JOURNAL OF INDIA.

CAMPHOR.

CAMPHOR is found in a great many plants and is secreted, in purity, by several laurels; it occurs combined with the essential oils of many of the Labiatae; but it is extracted, for manufacturing purposes, only from the *Laurus camphora*, or *camphora officinarum*, a member of the Laurel order, which abounds in China and Japan as well as from a tree which grows in Sumatra and Borneo, called in that country, *Kapour Barros*, from the name of the place where it is most common. This Sumatra camphor is the produce of the *Dryobalanops camphora*. The camphor exists, ready

formed, in these vegetables between the wood and the bark; but it does not exude spontaneously. On cleaning the tree which produces the Sumatra camphor masses of pure camphor are found in the trunk.

To prepare camphor the wood of the laurels is cut into small pieces, and put with plenty of water into large iron boilers which are covered with an earthen capital or dome, lined with rice straw. As the water boils, the camphor rises with the steam, and attaches itself as a sublimate to the stalks, under the form of granulations of a grey colour. In this state it is picked off the straw and packed for the market.

All the purifying processes proceed on the principle that camphor is volatile at the temperature of 400° F. The substance is mixed, as intimately as possible, with 2 per cent of quick lime, and the mixture is introduced into a large bottle made of thin uniform glass, sunk in a sand bath. The fire is slowly raised till the whole vessel becomes heated, and then its upper part is gradually laid bare in proportion as the sublimation goes on. Much attention and experience are required to make this operation succeed. If the temperature be raised too slowly, the neck of the bottle might be filled with camphor before the heat had acquired the proper subliming pitch, and, if too quickly, the whole contents might be exploded. If the operation be carried on languidly and the heat of the upper part of the bottle be somewhat under the melting point of camphor, that is to say, a little under 350° F., the condensed vapour would be snowy, and not sufficiently compact and transparent

to be saleable. Occasionally, sudden alterations of temperature cause little jets to be thrown up, out of the liquid camphor at the bottom, on the cake formed above, which soil it and render its resublimation necessary.

If to the mixture of 100 parts of crude camphor and 2 of quick lime, 2 parts of bone black in fine powder, be added, the small quantity of colouring matter in the camphor will be retained at the bottom, and whiter cakes will be produced. A spiral slip of platina foil immersed in the liquid may tend to equalise its ebullition.

By exposing some volatile oils to spontaneous evaporation, at the heat of about 70° F. a residuum of camphor is obtained, viz., from oil of lavender, 25 per cent. of its weight; from oil of sage, $12\frac{1}{2}$; from oil of marjoram, 10 per cent.

Refined, camphor is a white translucent solid, possessing a peculiar taste and smell. It may be obtained, from the slow cooling of its alcoholic solution in octahedral crystals. It may be scratched by the nail, is very flexible, and can be reduced into powder readily by mixing it with a few drops of alcohol and giving a few blows to the camphor. Mixed and distilled with six times its weight of clay it is decomposed, and yields a golden yellow aromatic oil, which has a flavour analogous to that of a mixture of thyme and rosemary; along with a small quantity of acidulous water tinged with that oil. charcoal remains in the retort. In the air, camphor takes fire on contact of an ignited body, and burns away with a bright fuliginous flame. Pieces of ignited camphor thrown into water perform peculiar rotatory movements.

PREPARATION OF LACQUER.

CHINESE lacquer trees grow mostly in the provinces of Shensi, Szechwan, Fukien, Hupeh and Yunnan. Lac from which varnish is made is taken from the lacquer tree. It contains iron sulphate and carbon and water. Lac which contains 80 per cent. of sulphate and less than 10 per cent. of water is considered to be of superior quality, while that containing less than 60 per cent. of sulphate and more than 30 per cent. of water, is of inferior quality. The amount of iron sulphate and carbon in the sap depends upon the quality of the tree, the kind of soil in which it grows, and how and when the lac is drawn from the tree. Lac taken from large trees with long leaves and thick bark is superior to that taken from smaller trees. Also, trees which grow in fertile soil and warm climate, and are well exposed to sunshine, produce a large quantity and a better quality of lac than trees otherwise planted.

Generally, lac is drawn from lacquer trees when they have grown to a diameter of five to six inches, between six and thirteen years. The best period in the year for collecting sap is between May and November, and the sap is most abundant from the middle of July to the middle of October. However, the best quality lac is obtained between the months of July and September. Sap collecting should not be done on rainy days. The presence of water, which gets into the bark through the cuts, usually causes injury to the tree. The best time of the day to work on the tree is early in the morning. The process of obtaining lac from the tree is as follows: in the case of a big tree, two V-shaped cuts are made on the side of the trees to a depth of about one-third of an inch.

The bark between the cuts is then peeled off, exposing a strip two or three inches long and one-third to one-half of an inch wide. At the converging point of the V-shaped strip, a shell or a bamboo tube is inserted to receive the sap. Trees are sometimes felled and the sap then extracted from the bark and branches, but such sap is of inferior quality.

The Japanese method of extracting lac from the lacquer tree is different. They first peel the bark from the tree. The first incision is made at a height of about six or seven inches above the ground. Parallel cuts are made at intervals of one foot two or three inches until the lowest branches are reached. The cuts are slantwise, and are more than two-thirds of an inch long. On the other side of the trunk cuts are made in the same fashion, but slanted in the opposite direction. In the case of a large tree cuts may be made on three sides. Then a long sharp knife is inserted into the trunk of the tree. Cream coloured, resinous sap which exudes from the bark is then scraped off. Each day one-fourth of the trees planted are worked upon. Sap obtained before July is called early lac and that between the middle of July and the middle of August "prosperous lac."

After the sap has been collected it is put into a brass pan to be heated. Bits of cotton are thrown into the liquid to attract pieces of bark and other materials before removal. Finally the sap is strained through paper, silk waste and hemp fibre in three layers, and is then a viscid, even-flowing fluid. This liquid is next evaporated for a day in a large wooden pan placed in the sunshine, when it assumes a dark brown colour. Wood oil is then added, and the lacquer formed.

Small Trades & Recipes.

Gilding or Silvering, Leather.

Powder resin finely, and dust it over the surface of the leather, then lay on the leaf, and apply (hot) the letters of impression you wish to transfer; lastly, dust off the loose metal with a cloth. The cloths used for this purpose become, in time, very valuable, and are often sold to the refiners at a high price.

Sizing for Linen.

A suitable sizing composition for linen is prepared as follows:—

Carbonate of soda, (crystallised)	1 part.
White wax	4 to 6 "
Stearine	4 to 6 "
Pure white soap	4 to 6 "
Fine Paris white o carbonate of magnesia	20 "
Potato Starch	40 "
Fine wheat starch	160 "

The ingredients are boiled with sufficient water to make 1600 parts altogether. If necessary some ultramarine is added to counteract the yellow tint of the linen. The linen is starched with this preparation, passed between 90 lbs., and dried. It is then sprinkled with soapwater and placed in the stamping-mill, afterwards steamed and calendered.

Yeasts.

(1) Hop yeast—Hops 1 ounce; water 3 pints; flour 1 teacupful, brown sugar 1 table-spoonful; salt 1 tea-spoonful; brewers' or bakers' yeast 1 gill.

Boil the hops twenty minutes in the water, strain into a jar, and stir in the flour, sugar and salt, and when a little cool add the yeast, and after four or five hours cover up, and stand in a cool place on the ice for use.

(2) Baker's Yeast—Hops 2 ounces, water 1 gallon; wheat flour 1 lb., malt flour 1 pint; stock yeast $\frac{1}{2}$ pint.

Boil the hops for thirty minutes in the water, strain, and let it cool until you can well bear your hand in it; then stir in the flour and yeast; keep in a warm place until well under way, and then let it work in a cooler place from six to eight hours, when it should be put in pint bottles about half full, closely corked, and tied down. By keeping this in a very cool cellar or ice house, it will keep for months, fit for use.

(3) Jug Yeast—Hops $\frac{1}{2}$ lb., water 1 gallon; fine malt flour $\frac{1}{2}$ pint; brown sugar $\frac{1}{2}$ lb.

Boil the hops in the water until quite strong; strain, and stir in the malt flour; and strain again through a coarse cloth, and boil again for ten minutes; when new milk warm, stir in the sugar, and place in a jug, keeping it at the same temperature until it works over; then cork tight, and keep in a cool place.

Antiseptic Powder.

Boric acid	50 Parts.
Salicylic acid	50 "
Dragon's blood	20 "
Calcium carbonate	1000 "
Essence spearmint	12 "
Reduce the dragon's blood and calcium carbonate to the finest powder, and mix the ingredients thoroughly. The powder should be used twice a day.	

Polishing Gold and Silver.

Silver is cleansed by placing the articles for a few minutes in a boiling hot solution of tartar, and then rubbing them with soft leather.

Gold is cleansed with Paris red and soft leather.

A polishing powder for silver ware etc. is made by mixing intimately 4 parts of washed pipe clay, and of purified tartar.

INDIA'S INDUSTRIAL PROGRESS.

Arts and Crafts of Bombay.

The Government of Bombay have recently decided to take steps to revive and encourage indigenous arts and crafts in the Bombay presidency. These include:—carpets, calico prints, hand woven silk, kinkhab, embroidery lace, carved sandal wood, lacquer work and jewellery. Before a definite scheme can be formulated it has been considered necessary to have a complete survey of the existing arts and crafts made by an experienced technologist who can judge and appreciate the productions of artists and artisans from their value. An experienced officer has therefore been appointed to investigate and report on the following points:—(1) the intrinsic value of the articles manufactured; (2) their artistic value; (3) the comparative prosperity of the trade; (4) the market for the goods; (5) the possibility of improvements in the method of manufacture, etc.

Home Industries of Bombay.

It is learnt from the annual report of the Department of Industries of Bengal that among the minor industries lock making and glass works in Howrah prospered while the condition of the brass and bell-metal industry in Midnapur, Bankura and Hooghly and the chikan industry in Hooghly remained stationary

The four sericultural demonstration centres and the industrial school for teaching weaving and carpentry on improved and scientific methods in the district of Bankura continued to do useful work. The local cobblers in Bankura continued to turn out good tanned leather and to manufacture boots and shoes for which there is a considerable demand. Enamel works were started at Palta and a paint factory at Sodepore in the 24-Parganas. The cane sugar industry in the Basirhat sub-division of the 24-Parganas has almost disappeared but *gur* is still manufactured on an extensive scale. The manufacture of sugar from date and cane was continued in the district of Jessore.

Silk Industry of Assam.

The Government of Assam are taking an interest in the development of cottage industries. They started a silk farm at Titagar, Jorhat, and have opened this year another farm at Shillong. Its object is to raise healthy and robust races of Endi, Muga, and specially of Pat, for distribution in the plains with a view to supplanting and regenerating the existing races of silk-worms. An attempt at improving the rearing conditions in villages *pari passu* with a supply of robust and disease-free seeds, is being made.

SCIENTIFIC AND TECHNICAL TOPICS

Camera-Guns for Policemen.

A camera-pistol that should be useful to the police in tracking criminals has been invented by a European who describes his invention as follows:—

The camera-gun is a pistol with a small camera attached, and produces, automatically and simultaneously with each shot fired, a picture of the object aimed at, even in darkness. After each shot fired, a new film will be exposed, and also, through clockwork in the construction of the gun, the exact time the shot is fired will be registered on the picture.

The advantages of this pistol over ordinary ones are several. A shot fired in the direction of the criminal would produce his photograph even if it missed him. The picture would prove whether the criminal was armed, and what he was doing when the shot was aimed at him.

The exact time the shot was fired would be ascertained, which is also an important factor in cases where the criminal escapes and tries to prove an alibi later.

Cotton Plant—A Mine.

The cotton plant is a veritable mineral mine under the hands of a chemist. In addition to iron, phosphorus, magnesium, calcium, potash and sodium, metallic elements commonly to be found in plants and considered essential parts

of them, copper manganese and zinc have been found occurring in the greatest concentration in the kernel of the cotton seed. It is suggested that these elements play a vital part as yet unknown, in the economy of the plant.

Waterfall Power.

Electric power can be produced most cheaply from large waterfalls. Spain, France, Italy, Switzerland, Germany, Austria, Sweden, Norway, Japan and many other countries can each develop millions of hydro-electrical horse-power from their magnificent waterfalls.

According to careful estimates, the United Kingdom may generate something like 1,000,000 hydro-electrical horse-power from its rivers. The power thus generated would be exceedingly expensive, because the mountain streams are small and many of them occur in far-away Scotland, not in the industrial districts.

Heart-Beats by Loud Speakers.

A remarkable demonstration of a speaking film in which sounds and images are perfectly synchronised has been given before the French Academy of Science by a French Scientist. The film represented a lesson by a physician on the action of various drugs on the human heart, the lecture being recorded on a phonograph at the same time as the pictures were taken.

Accurate synchronisation is obtained through the use of a photo-electric cell, and the reproduction of the sound record is controlled by the film itself. The sounds were amplified by loud-speakers. Perhaps the most striking part of this film lecture was the portion in which, when the doctor placed a stethoscope over a patient's heart, the heart beats were distinctly heard through the loud speakers.

Origin of the Vitamins.

Plants are the ultimate sources of vitamins to the animals. But how the plants synthesise these bodies is a mystery. The activity of ultra-violet rays is significant. It seems probable that vitamins are synthesised by the green leaves of plants with the aid of chemically active rays. When the green leaves are eaten by a herbivorous animal the vitamins pass on to the blood of the consumer. The sunlight which falls on the vast areas of the ocean is utilised by myriads of marine algae to make their vitamins. Perhaps these algae are the ultimate source of vitamins to the cods. This seems all the more probable since the marine algae yield, on extraction an oil which has the characteristic odour of codliver oil.

Playing Tricks on Nature.

Many attempts have been made to force Nature to produce unusual forms of plants and fruits.

For instance, almost every year a new variety of rose-tree is brought out. The successful grower experimented for three or four seasons, perhaps, to perfect his production.

Some time ago there was keen competition between horticulturists to bring out a black sweet-pea. No one has yet succeeded in doing this, but some sweet-peas have been quite near to it.

One of the most successful efforts in tampering with Nature was the production of "seedless" oranges.

The popular cherry has actually been produced without stones; while to cater for the taste of those who like apricots, but who are unable to pay the price demanded for the fruit, plums have been grown with an apricot flavour.

Stars to Broadcast Time.

Who would have thought that wireless would ever be able to let us know the precise moment when a star was "southing"—that is, crossing the meridian? Yet the thing has been made possible by the genius of a young Dane.

The star's light is converted into electric waves; special valves and a valve amplifier are used for the magnification and sufficient energy is produced to work a relay, and a dot is made on the paper as the star reaches the meridian. The conversion of the star's light into electric waves is accomplished by means of a photo-electric cell at the eye-piece end of the telescope.

A sound could thus be made by the star at the psychological moment and transmitted to listeners, who could be advised beforehand that the "click" they would hear would not be an "atmospheric" but the meridinal passage of the Dog Star, or Vega, or Arcturus, as the case might be.

FORMULAS, PROCESSES & ANSWERS.

Definition of Brandy & Whisky.

2418. C. B. D., Nadiad.—How are brandy and whisky to be defined?

Brandy is an abbreviation of "brandy wine" signifying burnt or distilled wine. It is usually defined as a spirituous liquid distilled from wine matured by age. Real cognac is distilled from grape juice and is the most sought after brandy; the grape is white and small in size and is grown on a calcareous soil. A small pot still is generally used, and there are usually two distillations: the first corresponds to the "low wine" or the whisky; it is very impure, and has a disagreeable odour and taste. The second distillation corresponds to the "spirits."

The primary constituents of whisky are ethyl alcohol, the characteristic flavour is due to small quantities of esters, acids, higher alcohols and aldehydes produced during malting fermentation, distillation and maturing.

Borax from Tincal.

2366. B. L. S. R. Mirzapur.—Wants to know how borax is prepared from crude borax.

Borax is found native in Alpine lakes, on the snow-capped mountains of India, China, Persia, in Ceylon, and Great Tibet. It is also found elsewhere.

Formerly tincal was purified by washing in water containing soda, to free the borax from adhering fatty substances which combine with the soda to form

an almost insoluble soap. After the borax has been well washed, it is dissolved in boiling water; for each 100 parts of refined salts there are added 12 parts of sodium carbonate. The solution is next filtered, and then evaporated to 26° to 30° Tw. It is now placed in wooden crystallising vessels lined with lead, where it is necessary to allow the fluid to cool gradually. Another method is to place the tincal in cold water, and to stir in 1 per cent of caustic lime. The fatty substances are thus removed, combining with the lime to form an insoluble calcium soap. 2 per cent of calcium chloride is added to the fluid, which is next evaporated and set aside to crystallise. Still another authority recommends the powdering of the tincal, which is next mixed with 10 per cent sodium nitrate and calcined in a cast iron pan, the fatty substances being thus destroyed. The calcined mass is dissolved in water, and the solution evaporated to crystallisation.

Green Oxide of Chromium.

2414. V. T. A. G., Thayetmyo.—Wants to know something about the manufacture and use of green oxide of chromium.

Eight parts potassium dichromate and 3 parts of pure boric acid are ground with to a stiff paste. The mixture is then heated to dull redness for about 4 hours in a reverberatory furnace. The

melt is thrown into water and boiled, to decompose borates of chromium and potassium into boric acid (hydrated). The latter is then washed, dried, and ground."

After it comes out of the dry room it has to be ground in a burr stone mill with water exactly like an oil colour. This develops whatever brilliancy there is in the colour and increases its hiding power but unfortunately it also develops a float of a very much more brilliant green than the natural chromium oxide. This float is similar in colour to the hydrated oxide of chromium, but is not apparent in the quicker drying types of paints.

Chromium oxide is now largely used as a basic colour in automobile painting, particularly in the painting of the hoods, and also for the manufacture of the best type of dark green engine enamels, because excessive heating or alternate heating and cooling, does not affect it in shade as it does the chrome green from yellow and blue.

Manufacture of Glucose.

2487. K. C. N., Calcutta.—Requests us to describe the process of manufacturing glucose.

On a commercial scale glucose is best prepared by heating freshly prepared potato or maize starch with dilute sulphuric acid in sealed copper vessels under 3 atmosphere pressure when the hydrolysis is complete, the acid is removed as calcium sulphate by the addition of powdered chalk, and the filtered solution after being decolorized by means of animal charcoal, is evaporat-

ed in a vacuum; a little anhydrous glucose is then introduced, and the syrup is allowed to crystallize at a temperature of 40°. Prepared in this way, the glucose forms a rather soft cake of small crystals; it is not a pure product being contaminated with maltose, inosaltose and dextrin; it may, however, be purified by recrystallizing from aqueous alcohol.

Prevention of Rust.

2351. N. I. S. T., Negapatam.—Asks how to prevent rust on steel goods.

The protecting or rust-preventing substances in general use may be divided, according to the purpose for which they are suited, into several classes, viz.:

I. Such as afford a permanent preventive remedy against the formation of rust, irrespective of the expense and difficulty of the process of application. This object can be attained by:—

(a) Enamelling, i.e. covering with a vitreous coating by the aid of great heat.

(b) Coating with other metals but little, if at all, liable to oxidation—zinc, tin, lead, copper.

(c) Pickling or browning, i.e., producing a layer of oxide or other compound on the metal, whereby further rusting is precluded for a long time.

II. Substances which will prevent the formation of rust for a lengthened period:—

1. Paints in general for use on iron.

2. Rust-preventing (anti-corrosive) paints; the conditions for their preparation and use.

3. Anti-fouling compositions (paints for ship's bottoms).

4. Other methods of rust-prevention:—

(a). Rubbing over with fats, oils, or compositions based thereon.

(b) Various processes for obtaining protective coatings against rust.

To this class belong:—

Coating with liquid or semi-fluid substances endowed with the property of drying hard, so as to form a solid integument preventing the access of air and and moisture; paintings with oil and other paints; coating with lacquers, varnishes, and tar or tarry bodies.

Developer for Films. *

2164. P. K. R., Sialkot.—Wants recipes for developers of positive and negative films.

For developing negative films a metol hydroquinon developer is largely preferred.

A typical formula is:—

Sodium sulphite	5 lb.
Sodium carbonate	2½ "
Potassium metabisulphite	1½ oz.
Metol	160 grs.
Hydroquinone	5 oz.
Potassium Bromide	¼ "
Citric Acid	¼ "
Water to	60 pints:

This solution should be used at a temperature of from 65° to 70° F: it will keep about a fortnight, and may be worked repeatedly till signs of exhaustion begin to be evident.

The formula is largely a matter of personal preference and practically any non-staining developer which will produce a good ordinary negative will act satisfactorily with films. It is the best policy, however, to use the formula recommended by the maker of the particular film selected, as this is sure to have been tested and found to have good results.

A suitable formula for the fixing bath is:—

Sodium

• Hyposulphite (Hypo)	14 lb.
• Potassium Metabisulphite	1½ lb.
Water to	56 pints.

The same developer may be used for positive if care is taken not to clog up the high lights, but a special solution is sometimes preferred. A good formula is:—

Sodium sulphite	3½ lb.
Sodium carbonate	3 "
Potassium metabisulphite	1 oz.
Hydroquinone	8½ oz.
Potassium bromide	1 "
Water to	60 pints.

Canes: Source & Use.

2223. R. K. D., Vizagapatam.—Wants to know the sources and uses of canes.

Canes are the produce of the Calamus genus of palms, the species of which are numerous in the islands of the Indian Archipelago, in the Malayan Peninsula, in the Madras territories, in the forests of the districts of Chittagong, Silhet, and

Assam, along the foot of the Himalayas as far north as Derha Dun. The species *C. Royleanus* and *C. Rotang* are common in Bengal and on the Coromandal coast. Both are used for all the ordinary purposes of cane: as, also, are *C. tenuis* of Assam, *C. gracillis*, *C. extensus*, and others. But those of the shops are gathered indiscriminately; and it is not possible to say from what particular species they come. *C. rotang* has however been said to furnish the stouter, and *C. Scipionum* the slenderer sorts. *C. Scipionum* of Louzeiro is considered to be the species which yields the well-known Malacca Cane, but the plant does not appear about Malacca and the canes are stated to be imported from Siak on the opposite coast of Sumatra.

The stem of *Calamus verus* is described as being 100 feet long that of *C. oblongus* 300 to 400 feet, of *C. Rudentum* upwards of 500 feet. Even another kind is stated to attain the extraordinary length of 1200 feet. In the Tenasserim Provinces, there are numerous species indigenous in the forest and the Karons have different names for seventeen species or varieties used extensively instead of cordage. The stays of the masts in native boats are usually made of rattans, and they are split up into strings for the innumerable purposes to which cord and twine are usually applied. All that gives stability to bamboo houses is the rattan which ties them together. The *Calamus rudentum* of Louzeiro is manufactured at Malacca into cables, and is employed for dragging great weights and binding wild elephants.

Gugul and Loban.

2152. J. B. O., Bharatpur State.—Asks how are gugul and loban obtained and what are its uses?

Gugul is a gum-resin yielded by the tree *Balsamodendron Mukul*. It occurs in vermicular or stielactitic pieces, is of a brown or dull green colour, and has a bitter, acid taste. It exudes from incisions on the bark made in the cold season. It swells when heated, diffusing a disagreeable odour.

Indian *Bdellium* (Gugul) is used in medicine as a demulcent, aperient, carminative, and alterative. It is also employed in the preparation of an ointment used for bad ulcers.

The Benzoin Tree, *Styrax Benzoin*, yields the true Benzoin or Gum Benjamin of commerce.

The trees, which are of quick growth, are raised from seeds and are grown on the edges of fields. When they are six or seven years old and have trunks 6 to 8 inches in diameter, they are judged capable of yielding the resin, and incisions are then made in the stems from which exudes a thick whitish resinous juice. This soon hardens by exposure to the air and is then carefully scraped off with a knife.

Loban is burnt as an incense in religious worship. On account of its disinfecting properties, the smoke it gives out is sometimes employed to drive away mosquitos and sandflies.

Glue Making.

2129. J. A. F., Calcutta.—Desires to manufacture glue.

Glue is principally prepared from the parings and waste pieces of hides and skins, the refuse of tanneries and the tendons and other offal of slaughter houses. These substances, when intended for the glue maker, are steeped for 14 or 15 days in milk of lime, then drained, and dried by exposure to the air. This constitutes what is termed the "Cleaning" or "preparation," and in this state the "glue pieces" as they are called, may be kept for a long time, and transported to any distance without suffering decomposition. Before conversion into glue they are usually again steeped in weak milk of lime, and next well washed and exposed to the air for 24 to 30 hours. They are then placed in a copper boiler two thirds filled with water, and furnished with a perforated false bottom, to prevent them from burning and as much is piled on as will fill the vessel and rest on the top of it. Heat is next applied, and the whole gently boiled or simmered together, until the liquor on cooling forms a firm gelatinous mass. The clear portion is then run off into another vessel, and a very small quantity of alum (dissolved) added; here it is kept hot by a water bath; and allowed to repose for some hours to deposit its impurities after which it is run into the "congealing boxes" and placed in a cool situation, the next morning the cold gelatinous masses are turned out upon boards wetted with water, and are cut horizontally into thin cakes with a stretched piece of brass wire, and then into smaller cakes with a moistened flat knife. The latter are placed on nettings to dry. The dry cakes of glue are next dipped one by one into hot

water, and slightly rubbed with a brush wetted with boiling water, to give them a gloss; they are, lastly, stove-dried for sale. This furnishes the palest and best glue. As soon as the liquor of the first boiling has drained off, the undissolved portion of skins, etc., left in the copper, is treated with fresh water, and the whole operation is repeated again and again, as long as any gelatinous matter is extracted. In this way a second and other inferior qualities of glue, are obtained. The product from dried glue-pieces is about 50 per cent.

Catechu.

2299. S. K. R. P., Rangoon.—Enquires how catechu is prepared.

The term is applied to several astringent extracts made from the wood of several plants which grow in Bombay, Bengal, and other parts of India. The ordinary commercial catechu is prepared by boiling the chips of the interior of the trunk of the *Acacia Catechu* in water, evaporating the solution to the consistence of syrup over the fire, and then exposing it in the sun to harden. It occurs in commerce in flat rough cakes, and under two forms. The first, or the Bombay, is of uniform texture, of a dark red colour. The second is more friable and less solid. It has a chocolate colour, and is marked inside with red streaks. The Bombay variety is richer in tannin than that from Bengal.

Areca nuts are also found to yield catechu and catechu is prepared from them in Ceylon, for which purpose they are cut into pieces, watered in an earthen pot with solution of nitre, and have a

little of the bark of a species of *Mimosa* added to them. The liquor is then boiled with the nuts, and affords an inspissated decoction.

Good catechu is a brittle compact solid, of a dull fracture. It has no smell but a very astringent taste. Water dissolves the whole of it, except the earthy matter, which is probably added during its preparation.

Catechu has been long employed in this country for tanning skins when it is said to effect this object in five days. It has also been used to give a brown dye to cotton goods.

Purity of Sandalwood Oil.

1870 S. L. J., Kanauj.—Asks how to test the purity of sandalwood oil.

East Indian Sandalwood oil is a rather viscid, pale yellowish to yellow liquid. It possesses a peculiar, faint but very persistent odour and a hot unpleasant, resinous harsh taste.

The best method to determine the purity of sandalwood oil or to ascertain the amount of adulterant present, is to determine its santalol percentage. Good oils contain mostly from 94 to 98 p.c. but never below 90 p.c. of santalol.

An easy test for santalol consists in heating the oil with glacial acetic acid in a closed container to 150°, thus converting the alcohol into its acetate and to saponify the ester by means of alcoholic potassium hydroxide. It is more expedient, however, to determine alcohols in volatile oils by means of acetic acid anhydride.

Frequently the determination of the physical constants suffices to distinguish a pure oil from an adulterated one.

Getting Rid of Ants.

1917. N. R. C. L., Muktsar.—Wants some hints for getting rid of ants in the garden.

Place an inverted garden-pot over the nest, and the ants will work into it. Remove the pot in a day or two by placing a spade underneath it; then plunge it, with its contents, into boiling water, and repeat if necessary. Ants may be expelled from any particular plant by sprinkling it well with sulphur. Ants may also be destroyed by pouring boiling water on the nest or by a mixture of sugar and beer in which arsenic has been mixed. Chloride of lime will also drive them from their haunts.

The following, which is an Indian preparation, is specially recommended as a preventive against ants.

GONDAL FLUID.

Gum	4 oz.
Asafoetida	8 oz.
Bazar Aloes	8 oz.
Castor Cake	3 oz.

Mix well with water, add clay to thicken, and paint on the base of trees which are liable to be attacked by ants.

Cast Iron and Steel.

783. B. K. R., Punalur.—Wants to learn the difference between cast iron and steel.

The following are the definitions required. **CAST IRON**—Generically, iron containing so much carbon or its equivalent that it is not malleable at any temperature. Specifically, cast iron in the form of castings other than pigs, or remelted cast iron suitable for casting into such castings, as distinguished from pig iron, i.e., cast iron in pigs.

STEEL.

Iron which is malleable at least in some one range of temperature, and in addition is either

(a) cast into initially malleable mass, or (b) is capable of hardening by sudden cooling or (c) is both (a) and (b) so capable of hardening.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

2036. S. R. K. Bombay.—Cloth manufacturers of Germany, England:—Bolling & Pastor, Congressstrasse, Aachen, Germany; Wilkes & Co, Ander Frauenbrudern 4, Aachen, Germany; Katz & Leiser, Reitbahnstrasse 20, Dresden, Germany; Pick & Co, Aug, Fleischerplatz 2-5, Leipzig, Germany; Weinberger Theodor, Zimmerstrasse 33, Kottbus, Frankfurt, Germany; G. Atkins & Co, 46 Well Street, Bradford, England; British Textile Co, 26 Canal Road, Bradford, England; Kessler & Co. Ltd., 64 Vicar Lane, Bradford, England; Atkinson & Co. Ltd., 11-14, Addington Street, London, S. E. 1; H. Jacobson & Co, 85 Commercial Street, London E. 1 and Johnsons & Sons Ltd, 15 — 16, Aldermanbury, London E. C. 2.

2038. V. M. R. P, Tinnevely.—The query is outside the scope of **Industry**.

2040 R. S. M, Gulbarga.—You shall have to serve as an apprentice to learn the arts which are no where taught in India. The following addresses will be helpful to you — (1) The Gwalior Pottery Works, Gwalior; (2) Calcutta Pottery Works, Tangra, Calcutta; (3) Aluminium Works, Jewanlal & Co, 55 Canning Street, Calcutta. For machineries and estimate write to the Oriental Machinery Supply Agency, 20/1, Lal Bazar Street, Calcutta.

2042. K. J. N. Bombay.—Informs P. D G Bankura that they are the biggest importers of saffron in India.

2044. S. M. A, Nadia.—Exhaustive recipes for sealing waxes appeared in March 1925.

2045. S. C. G., Calcutta.—If you wish to qualify yourself for agency business you can do no better than peruse regularly **Commercial India**, the sister journal to **Industry**.

2046. M. R. H., Nowgong.—For lubricating oils, write to (1) Don Watson & Co., 8, Lyons Range, (2) Vacuum Oil Co., 2 Clive Row, (3)

Valvoline Oil Co, B-5, Clive Bldgs., 8 Clive Street; all of Calcutta.

2047 W. D M S, Dharwar.—An exhaustive article on making boot polish of all sorts appeared in June 1923.

2048 K T Point Pedro.—Recipe of Tobacco Flavour appeared in July 1926. An illustrated article on candle-making appears in this issue. Liquid opium is not known—except in solution. For ideas and suggestions on Indo-Ceylonese trade you should peruse **Commercial India**, the sister journal to **Industry**. Wants to be put in touch with beedi and cigar makers of India. Addresses of foreign manufacturers form a regular feature in **Commercial India** as its Directory of Reference. You can learn snuff making by reading Tobacco and its Preparations published by this office.

2049. P. K A, Travancore.—An illustrated article on grafting appeared in June 1924.

2051. A. B. K, Poona City.—No further particulars of electricity from metal are available. As regards radio communication you should read some books on the subject which may be supplied by Thacker Spink & Co., 3 Esplanade East, Calcutta.

2054 S. B D, Chittagong.—Process of silvering mirror appeared in December 1925 issue.

2055 K A H S, Banganapalle.—Recipes of various kinds of soaps appeared in the last volume of **Industry**. Soap making apparatuses may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lal Bazar Street, Calcutta.

2056. H. C. R., Karachi.—Utensils required for manufacturing mucilage and gloy are pans, ladles, bowls, funnels, etc. For percolating gum arabic you may use filtering apparatus that may be bought of Scientific Supplies Co., 29-31, College Street Market, Calcutta. You may add a little quantity of boric acid to your gloy for preserving it for long time. There is no chemical that makes gum transparent.

2058. R. S. M., Gulbarga.—Match making machines may be had of Bengal Small Industries Co., 91, Durga Charan Mitter Street and Bhawani Engineering and Trading Co., 122/1, Upper Circular Road; both of Calcutta. Machines used in a brass utensils factory may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. Pottery machines may be supplied by American Clay Machinery Co., Bucyrus, Ohio and Crossley Machine Co., Trenton, New Jersey, both of U. S. A. An article on ceramic industries will be found in July 1925 issue. An article on match industry appeared in July 1922 issue.

2059. B. K. T., Ajmer.—Addresses of watch dealers will be found elsewhere in these columns.

2060. C. V., Varsapur.—Sewing thread may be supplied by Shah Daraza Sewing Cotton Co., Hyderabad, Sind. It is not possible to melt horns, you can only soften them. Soak horns for 3 or 4 days in a solution of 1 oz of spirit of nitric acid in 5 oz distilled water.

2061. S. E., Bombay.—Recipes you want appeared several times in previous volumes of **Industry**.

2062. A. K. Y., Bombay.—Your enquiry is outside our scope. You better take legal advice to realise the money deposited by you.

2063. P. S. V., Beaconsfield, Cape Province, South Africa.—For particulars of sweeps drawn in Calcutta write to the Secretary, Royal Calcutta Turf Club, 12, Russell Street, Calcutta.

2066. S. L., Peshwar.—Glass sheets may be had of Fotic Lall Seal & Sons 16, Swallow Lane, Calcutta; Adanyee Aboulali & Sons, Bunder Road, Karachi; and Ebrahim Pumahomed &

Co., Bunder Road, Karachi. Picture frames may also be supplied by the above firms. Pictures may be bought of Roy Babajee & Co., 182, Lower Chitpore Road, Calcutta; J. D. Beevan & Co., Charing Cross, Lahore. There is no arrangement for learning dairy farming, art painting, electro-plating, soap-making, etc. You should try to be an apprentice in firms doing those works. As regards art painting you may write to the Principal, Government School of Art, Chowringhee, Calcutta, and Government School of Arts & Crafts, Lucknow.

2067. R. K. B., No address.—Your query is outside the scope of **Industry**.

2068. C. M. Z., Suat.—Addresses of foreign periodicals will be found elsewhere in these columns. A good recipe of tooth powder will be found in March 1925 issue. Your other enquiry is unintelligible.

2069. B. P. S., Basti.—A notice of your spinning machine appears elsewhere in this issue.

2071. D. D. S., Muttra.—Antimony may be bought of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta. Shell cannot be softened. Sulpho-hydrate of sodium may be had of B. K. Paul & Co., 1/3, Bonfields Lane, Calcutta. Process of melting copper and antimony appeared in July, 1926 issue.

2072. M. R., Gorakhpur.—Your query is unintelligible.

2074. M. P. D. C., Shahjahanpur.—Homeopathic books and medicines may be had of King & Co., 83, Harrison Road; C. Ringer & Co., 4, Dalhousie Square; Berigny & Co., Mercantile Bldgs; Lahiri & Co., 35, College Street and Sett Dey & Co., 42, Strand Road; all of Calcutta.

2076. M. B. S., Rangoon.—Patent medicines may be bought of Martin & Harris, Waterloo Street, Calcutta.

2078. G. D., Jammoo.—For trade mark registration write to P. Lodge & Co., Post Box No. 6772, and Alum & Co., 42, Beniapukur Road; both of Calcutta.

2079. R. D. C., Telegoon.—Use of straw rags or waste paper in place of sifted saw dust will not prove successful. As far as we know there is no defect in the formula referred to by you. For preparing liquid glue the follow-

BIGGEST HOUSE FOR NOVELTIES

IN THE LINES OF:—

Pocket Knives, Scissors, Picture Cards, Wall Pictures, Cigarette Machines, Magic Cards, Brooches, Bangles, Mechanical Toys, Cigarette Holders, Mouth Organs, Albums, etc., etc.; order for sample assortments value from Rs. 10/- to Rs. 250/-; 25 per cent discount on samples open only. Orders accompanied by advance given preferential attention.

MIRS, CHANDRA & CO.

Hyderabad (Sind.)

ing process should be adopted. Slaked lime in powder $\frac{1}{2}$ oz.; sugar, 2 oz.; mix and add enough water to produce about 6 fl. oz. Keep at a temperature of about 150 deg. F. for several hours, stirring occasionally. Allow to stand, then filter off as much as possible, and in each five parts of the filtrate dissolve by gentle heat, one part of good glue. Whiting is chalk carefully cleared of all stony matter, ground, levigated and made up into small oblong cakes. As it is often used as a polishing material, it should be very carefully freed from all particles of flint or sand. Process of preparing sodium silicate appeared in November 1924 issue.

2080 M. S. R., Madras—Wants to be put in touch with garlic and grain merchants of Punjab, Godhra and Cawnpore. We have no such book. For the book required enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2081 C. R. D., Noakhali—It is not possible to explain the terms and symbols of higher chemistry. You should better go through a manual on organic chemistry that may be supplied by Chakraverty Chatterjee & Co., Ltd., 15, College Square, and Book Co., 44A, College Square; both of Calcutta.

2082 S. D. N., Simla—Yes, there is a glossary appended to the end of the book. Can supply euphorbia juice.

2083 K. H., Ahmedgarh—Addresses of newspapers and periodicals appear elsewhere in these columns. For more addresses you may consult Thacker's Indian Directory, 3, Esplanade East, Calcutta.

2084 D. N. S., Rangoon—You may mix til oil with coconut oil in equal quantity so that coconut oil will not freeze.

2085 K. C. K., Travancore—Ink eradicator may be supplied by Calcutta Stores, 7/1, Tagore Castle Street, Calcutta.

2086 M. A. E., Ernakulam—Process of preparing banana powder will be found in March 1922 issue. For preparing tapioca powder use pulverising machine. The machine may be supplied by Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. Pro-

cess of manufacturing arrowroot will be found in October 1922 issue.

2089 J. N. S., Muttra—Vide No. 2071.

2090 J. N. S., Moulmein—Toilet requisites may be supplied by Burgoyne Burbidges & Co., Ltd, High Street, East Hamp, London, E. C. Schimmel & Co., Miltitz bei Leipzig, Germany; Heine & Co., A-G, Leipzig, U Groba, Germany and Parfumerie Rationelle, Richer 19, Paris, France.

2093 M. D. S., Rayadrug—You will have to subscribe Swiss Exporter, Chamber of Commerce, Berne, Switzerland.

2094 L. B., Rawalpindi—Envelopes are manufactured in envelope making machines which may be supplied by Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. In making handkerchiefs sew the border in a sewing machine.

2096 H. V. S. R., Hindupur—On the 29th October Rs. 100 was equal to 1100 francs.

2097 C. S. G., Nattarampalli—Button making machines may be bought of Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. Match making machines may be supplied by Bengal Small Industries Co., 91, Durga Charan Mitre Street, Calcutta. Recipes of match compounds will be found in September 1923 issue.

2098 C. N., Lankynsch—Process of glass making appeared in December 1925 issue.

2099 V. L. V. C., Uttankarai—An article on vermicelli making will be found in January 1925 issue of Industry. Vermicelli making

THE ONLY TIME TO ENCOURAGE. SWADESHI INDUSTRY.



Purchase KIRLOSKAR PUMPS.

Write for full particulars to Sole Agents—for India, Ceylon, etc.

K. B. JOSHI & CO.,

321, Hornby Road, Fort, Bombay,
Post Box No. 534.

Calcutta—84A, Clive St.,
Post Box No. 675.

Karachi—Bunder Road,
Post Box No. 230.

Madras—Post Box No. 1260.

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices.

machines may be had of Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta.

2100. R A S., Kumta—Process of embossing on leather appeared in the last issue. If you follow the process you will be able to print gold letters on leather. List of ingredients required will also be found in that issue.

2101. H M S E., Ayakudi—In order to have a clear idea of the terms used in the columns of *Industry* you will require some knowledge of chemistry, otherwise you will have to take service of a chemist.

2102 M L, Hissar—We have not received your book

2103 P S P., Secunderabad—For industrial books enquire of Chakraverty Chatterjee & Co. Ltd, 15, College Square and Thacker Spink & Co., 3, Esplanade East; both of Calcutta

2104 V C W., Nizamabad—Enamel wares may be bought of Satish Chunder Daw & Co., 142/2, Old Chinabazar Street and Fbram Peermahomed & Co., 24, Old China Bazar Street; both of Calcutta. Shellac may be bought of Bengal Shellac Factory Ltd, 55-58, Ezra Street and G Hurry & Co., 53, Ezra Street; both of Calcutta. Sanitary equipment may be supplied by Incell Silk Ltd, Esplanade Mansion, 1, Esplanade Row, Calcutta; Moosaji Albbhoy & Sons, Napier Road and Ramchand Gurdasmal & Sons, Bunder Road; last two of Karachi. Other addresses you require appeared in the last issue. Wants to be put in touch with Indian agents of W Canning & Co., of Birmingham and May & Baker Ltd, of London.

2105. M. E., Madras—For platinoid wire enquire of Scientific Supplies Co., 29/31, College Street Market, Calcutta.

2106. S. S. G., Bikaner.—Reply to your enquiries appeared in October issue.

2107. V. B. D., Kapadwanj.—Further particulars of grafting cotton plant are not available.

2108. K. B. S., Munnirpallam.—For sheet metal machines enquire of Taylor & Challen, Birmingham.

2109. D. N. M., Gurukul Kangri.—The office of the Indian Industrial Congress is at 19, Bank Street, Fort, Bombay.

2111. B. T., Tangail—Your queries have already been replied. You may write only to the advertisers of current year

2113 R S. B. S., Boha—For premium bonds enquire of Alex Brault, 7/1, Wellesley Place and Horwitz & Co., 4, Dacres Lane; both of Calcutta

2114 P., Bargarh—Derby sweep tickets should be bought through a member of the Royal Calcutta Turf Club, 12, Russel Street, Calcutta, as it is not sold to any one other than a member of the club

2115 A S E M., Ernakulam—In order to dispose of the goods you stock please advertise in the pages of newspapers and periodicals. Your query being in the nature of an advertisement should not be published in these columns.

2117. A A, Bombay—For running an advertising agency business you may go through the advertising pages of newspapers and periodicals and write them your business terms and quotation for advertisement in various papers. Then if the parties are satisfied with your terms and quotation they will send advertisement through you.

2118. S. C. N., Sialkot.—For seeds enquire of Nurjehan Nursery, 2, Kankurgachi 1st Lane and Sutton & Sons, 35 & 36, Park Mansions; both of Calcutta. Sheet metals may be bought of Balmer Lawrie & Co., 103, Clive Street, Calcutta. Cooking utensils may be bought of Indian Aluminium Co., Triplicane, Madras, Victoria Aluminium Works, Ghosery, Salkea, and Aluminium Mfg. Co., Dum Dum, Calcutta.

2119. B. M. J., Radhanpur.—Following chemicals are mostly used in photography: soda sulphite, sodium hyrate, potassium bromide,

SETT DEY & Co

ORIGINAL HOMEOPHARMACISTS,

42 Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations

Catalogue Free On Application

potassium carbonate crystal, metol, hydroquinone, soda carbonate crystal, silver nitrate, nitric acid, ferrous sulphate, copper sulphate, etc. Chemicals may be bought of Calcutta Photographic Stores & Agency Co., 154, Dharamtala Street and Calcutta Camera House, 158, Dharamtala Street; both of Calcutta.

2120. D. K. D. B. Sirsi.—Refer your query to the Bombay Millowners' Association, 50, Graham's Bldg., Parsi Bazar Street, Fort, Bombay.

2121. P. N. S., Kolhapur.—In order to avoid scum add a little quantity of boric acid.

2122. H. C. D. Sylhet.—There are many dairy farms in India such as Coronation Dairy, Shillong, Assam; Central Dairy Farm, 55/26, Machuabazar Street, Calcutta; Model Dairy Farm, 25, Pollock Street, Calcutta; Sochi Agricultural, Horticultural and Dairy Farm, Nyagram, Midnapore. For a complete list of dairy farms go through Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. You may go through the following books: Dairy Farming in India by D. J. Megher & R. E. Vanghan; Cow Keeping in India by Isa Tweed. For practical instruction you may write to The Mission Poultry Farm, Etah. As regards prospectuses, memoranda, etc., enquire of the above dairy farms. For securing hogs, etc., put an advertisement in newspapers and periodicals or you may secure them locally. You may also go through July 1926 issue of *Industry*.

2123. N. P. L., Rohri.—Reply to your queries appeared in September issue under No. 1850. For books on laundry try Thacker Spink & Co., 3, Esplanade East, Calcutta.

2124. H. F. C. M., Ludhiana.—Your enquiry is not in our line. Please take legal advice.

2128. B. D., Rewari.—For books on tailoring enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2133. M. G. A., Masar Road.—For Sealing wax making moulds, etc., enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

2135. A. M. J. S., Bhera.—It is not possible to deodorise "gandha biraja" and "sarsoon" oil.

2136. J. N. C., Madras.—For label printing you may write to Furstenau Oskar, Reudnitz, Kohlgartenstrasse 13, Leipzig; Karl Gothner, Reudnitz, Comeniusstrasse 17, Leipzig; C. L. Keller, Brandeburgstrasse 43, Berlin and C. Creutzburg, Arnoldstrasse 6/8, Dresden; all of Germany.

2137. T. K. T., Calicut.—For preparing envelopes buy an envelope making machine that may be supplied by Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. Instructions will be given by the machine supplier.

2138. G. P. P., Jharsaguda.—Recipes of hair dyes will be found in January 1925 issue. Phials may be bought of S. K. Dey & Co., 124, Shovabazar Street, Calcutta. Brushes required may be bought of Calcutta Brush & Fibre Co., 172, Bowbazar Street, Calcutta and Brushwares Ltd., 123/1, Halsey Road, Cawnpur. Printed tin pots may be had of Calcutta Tin Printing Works, Post Box 6772, Calcutta. A good recipe of tooth powder will be found in March 1925 issue.

2139. S. S., Idak.—Wants to know the address of Mysore Chemical Pharmacy.

2140. S. C. N., Sialkot.—Vegetable ivory has not yet been put in the market on commercial scale, it is in its experimental stage.

2141. P. V. S. V., Karur.—You may write to the following correspondence schools: The School of Simplified Study Ltd., 17 St. Paul's Chambers, 19/20, Ludgate Hill, London, E. C. 4; The School of Authorship, 6, Granville House, Arundel Street, Strand, London, W. C. 2, and Oxford Correspondence College Ltd., St. Giles, Oxford, England. For learning magic write to K. S. V. Nath, Pudukottai and P. R. Janardhanam Naidu, Ongole, Guntur.

WE ARE WHOLESALE SUPPLIERS Of German Black Hair-Dye

Throughout India as Our Rates are the Lowest.

The Hair-Dye is a single powder packed in Blue Phials.

Price per Doz. Phials Rs. 2-4, Postage As. 12.

B. JAIRAM SINGH & SONS,
Krishna Market, Amritsar.

2142. H. N. C., Bhalod.—For model plaster busts enquire of School Book Supply Depot, Bow Bazar Street, Calcutta

2143 S. C., Allahabad.—Glass phials may be bought of Calcutta Glass and Silicate Works, Belgachia; S. K. Dey & Co., 124, Shova Bazar Street; C. K. Das & Sons, 17, College Street and Satya Charan Paul, 194, Old China Bazar Street; all of Calcutta. Tin boxes may be supplied by Gajanand Rampertap & Co., 6, Hali Bagan Road, Calcutta.

2144. R. Bros, Rajgangpur.—There is no book on biri making known to us. An article on biri making appeared in May 1925 issue of *Industry*. Wants to be put in touch with suppliers of biri tobacco in Gujrat (Kathiawar) and Nipani (Belgaum).

2145. B. R. N., Urvakonda.—For books on biscuit making write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

2146. I. W. S., Pyinmana.—Wants to be put in touch with sole agents for Italy nut buttons and German, American and English rolled gold studs and sleeve links.

2148. G. V., Raduar.—Recipes are not generally repeated

2149. P. D. P. S., Muttra.—You may refer your enquiries to "L' Association Nationale de Expansion Economique, 23, Avenue de Messine, Paris, France

2150. M. M. G., Trichur.—Replies to your queries appeared in last April issue under No. 13 in Brief Queries and Replies columns of *Industry*.

2151. K. P. K., Poona City.—For label printing and design write to Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta; Rosch & Winter, Querstrasse 17, Leipzig, Germany; Bibliographisches Institut A|G, Tanbchenweg 17, Leipzig, Germany; Pharos-Verlag, G. m. b. H., Lindenstrasse 3, Berlin, Germany; Brandon Printing Co., Nashville, Tennessee, U. S. A. and Commercial Printing & Lithographic Co., Akron, Ohio, U. S. A. Process of preparing vinegar appeared in September 1926 issue. If you be a member of the Royal Horticultural Society you will be able to write F. R. H. S. after your name. By this you will gain very little.

2155 T. P. Benares.—Rebuilt printing machines may be supplied by Walker Bros., 61 New Street, Fleet Street, London, E. C. 4

2156 R. P. Jammu.—Process of colouring electric bulb will be found in March 1925 issue.

2157 S. A., Malvan.—There is no one known to us who teaches dentistry by correspondence. Wants to be put in touch with bamboo dealers of Central Provinces. Desires to buy skins of coffee beans

2158 A. R. G., Thana.—Process of preparing agarbatties appeared in May 1924 issue.

2159 A. C. M. W., Lyallpur.—Anthracene and rosin oil may be bought of P. Mukherjee, 29, College Street Market, Calcutta. Wants to be put in touch with manufacturers of parry chain and P. W. O. cycle pumps and saddles of Brooks.

2160 S. K. A., Ambala City.—Addresses of homeopathic medicine dealers of Germany appeared under No. 1671 in September issue of *Industry*.

2161. B. D. Tando-Adam.—There is no college known to us that trains students by correspondence for B. A. Examination. You may learn shorthand at Government Commercial Institute, Bowbazar Street, Calcutta. For further particulars write to the Principal of the College. To qualify yourself as a graduate you have to pass other two examinations, viz., School Final and Intermediate examinations.

2162. P. S., Bombay.—Astrakhan is the wool or fur of a peculiar kind of sheep raised in Bokhara, Asia. Wants to be put in touch

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College
USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers

Factory—Baranagar and Barisal,

Office—113, 114, Khargapetty St., Calcutta.

with manufacturers of Astrakhan cloth in India.

2163. D. R., Patiala.—You perhaps mean thread balling machine that may be supplied by Orienta Machinery Supply Agency Ltd, 20/1, Lal Bazar Street, Calcutta

2165 D. S. M C, Sargodha.—For electro blocks enquire of S K Bhattacharjya & Sons, 114, Shovabazar Street, Calcutta For enameling plates enquire of Bengal Enamel Works Ltd, 55, Canning Street; Bengal Enamel & Stamping Works, 9, Middle Road and Pioneer Enamel & Iron Works, 82, Colootola Street; all of Calcutta

2166. T P, Benares.—Vide No 2155 above

2167 D R, Tando Adam.—Talking machines may be supplied by Adler Phonograph Co, Dresdnerstrasse 50, Berlin, Germany; Anker Phonograph GmbH II, Sedanstrasse 47, Berlin, Germany, Columbia Gramophone Co, New York, U S A; Sonora Phonograph Sales Co Inc, New York, U S A and General Phonograph Corporation, New York, U S A Perfumeries may be supplied by Auzora Perfumery Co, 28, 32 & 34 Willesden Lane, Kilburn, London, N W 6; Burgoyne Burdidges & Co, Ltd, High Street, East Ham, London, E C, Schimmel & Co, Miltitzbei Leipzig, Germany, Heine & Co A-g, Leipzig, Germany Glass bottles and phials may be supplied by Ballaire Bottle Co, Bellaire, Ohio, U S A; Illinois Glass Co, Alton, Illinois, U S A, C F Beetz, Grosspreitenbach, i Thuringen, Germany; Kasai Brothers & Co, 2 Chome, Sannomiya-cho, Kobe, Japan and Mizuchi & Co, 75 Nichome, Kita-Kyuhoji-machi, Higashi-ku, Kyoto, Japan

2168. S N. C, Ghoranara.—For preparing snuff go through Indian Tobacco and Its Preparation published from this office For selling addresses you may advertise in the Sale and Exchange columns of **Industry**. Process of preparing citric acid appeared in September 1925 issue. An article on dry battery appeared in November 1925 issue.

2169. A. K. C., Vizianagram.—Locks may be bought of The Upper India Lock Factory; Electric Lock Works, Madar Gate; Diamond Jubilee Lock Factory; all of Aligarh. Rubber

shoes may be bought of Roy & Co, 1 Cornwallis Street, Calcutta. The agent of Cobra boot polish is Messrs. Hoare Miller & Co., 5 Fairlie Place, Calcutta

2170 F D, Shahpur.—A recipe of hair dye powder appeared in September 1922 issue. A formula of ink powder will be found in July 1926 issue. Your other query is unintelligible.

2171 I S, Cocanada.—Vide No 2170 above.

2172 J F, Calcutta.—Cardboard boxes are manufactured by H L Sett & Sons, 8 Nilmoney Mitter Street; Kundu & Dass, 20 Gour Laha Street and Calcutta Fine Art Cottage, 76 Dharamtala Street, all of Calcutta.

2173 G V, Narasapur.—For manufacturing imitation precious stones seek expert advice.

2174 S I, Jhalabad.—Castor oil making bought of Panchkari Tatt & Sons, 6 Mirbahar Ghat Street, Bara Bazar, Calcutta; Anath Nath Dey, 4 Moidaputty, Bara Bazar, Calcutta and P. M Shaw & Co, Umed Bhagwan Bldg, 115 Bhoiwada 3rd Lane, Bombay.

2175 M L S, Nasirabad.—Oil extracting machine may be bought of Burn & Co, Hong-kong House, Council House Street and T. E. Thomson & Co, 9 Esplanade East; both of Calcutta For mail order business you may go through Money Making by Mail and Mercantile & Mail Order Letters & Methods by K M Banerjee to be had of this office. For starting commercial school take expert advice.

2176 V. T. J. T. R, Parvatipuram.—Wants to buy Hoar, Dragaon, Lucknow, and Lahore Golas and Saharaji variety pigeons.



**Cheapest House For
SPORTING GOODS
Silver Medals, Cups &
Shields.**

**Fine Silver Medals in
Velvet lined cases.**

• Rs. 3-12 each. •

**Largest Stock & Variety
Illustrated Lists Free.
CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

2177. H. K. S. R., Bolgarh—Process of manufacturing vermilion appeared in November 1925 issue. For starting vermilion making you may invest Rs. 1000. For preparing hair oil you may go through the booklet.—Hair Oil Manufacture published from this office. The book on Tobacco Preparation deals with preparation of all kinds of "hucca" tobacco. For starting slate and slate pencils making business. Rs. 1000 will do in the beginning. Seek medical advice. Rs. 10,000 will be a fairly good sum for starting brick manufacture. Brick making machines may be supplied by Manollasini & Co., Mangalore-Kankanady. Rocky soil would not be suitable for brick making. Process of preparing vegetable butter appeared in July 1926 issue. An article on brick manufacture will be found in August 1926 issue.

2178. S. K. D., Calcutta.—If you go through the booklet on Hair Oil Manufacture published from this office you will get every information in detail.

2181. A. S., Surat.—For photo paper enquire of Calcutta Photographic Store & Agency Co., 154, Dharamtola Street, Calcutta. A recipe of developer will be found in October 1926 issue.

2182. R. D. J., Almorah—Cabbage flowers are not made in India; these are imported from U. S. A., England, France and other cold countries. For making cauliflower seeds go through some books on germination of seeds to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. Toys may be supplied by Chichgar's Toy Works, Karachi, A. M. Mankame & Co., 148, Cover Kalbadevi, Bombay and Frenchman Bros., 231, Hornby Road, Bombay. Wants to be introduced to the sole agent for Meccano. Fancy paper articles may be supplied by K. B. Nan, 233, Old China Bazar Street,

Calcutta. Pocket lamp batteries and bulbs may also be supplied by the above firm.

2183. W. N. M., Allahabad.—There are many oil mills working throughout India, addresses of some of them follow; Lakhimpur Oil Mills, Rehabari, Dibrugarh, Assam; Ishur Chunder Ghose's Mills, 138, Upper Circular Road, Calcutta; Paul Chaudhury's Mustard Oil Mills, 244/2, Upper Circular Road, Calcutta; Victoria Mills Co., Bhagalpur City; Swadeshi Oil Mills Co., Ltd., 13, Tamarind Lane, Fort Bombay; Hira Chand Ganga Ram Oil Mills, Barsi Town, Dist. Sholapur; Moola Oil Co. Ltd., Rawalpindi, Punjab; Budhi Mall Oil Mills, Co., Ltd., Cawnpore. Oils are imported by H. Alexander & Co., Ltd., 44/46, Leaden Hall Street, London E. C. 3, and Packing House Product Co., Ltd., 6 Holborn, Viaduct, London E. C. 1. Oil mill machinery may be supplied by Greenwood & Batley Ltd., 16, Great George Street, Westminster, London S. W. 1, and Burn & Co., Hongkong House, Council House Street, Calcutta. These firms will also supply you with estimates and other necessary information. Other industries referred to by you have much prospect now.

2184. D. L. S., Karwi.—For the exact quantity of brandy to be administered to the person bitten by a snake consult a physician. For steel wire enquire of Mohendra Nath Seal & Co., 79, Clive Street and C. Mukherjee & Co., 98, Clive Street; both of Calcutta. Formulas of Amritdhara and Amritdhara Ointment are kept secret as trade secret. You may start your business without taking any special permission. As regards income tax the query is not in our line.

2185. S. K. K., Bombay.—Magic lanterns may be bought of Calcutta Camera House, 153, Dharamtola Street, Calcutta. The following is a list of some of the advertising agents of foreign countries: A. Adib George, 6, Averoff Street, Alexandria, Egypt; Caxton Translation Institute, 47, Victoria Street, London S. W. 1, and Feiertag & Beyer, Buchholz, Germany. For a list of newspapers of South India to insert advertisement write to Rao's Advertising Agency, P. O. Box 49, Madras.

BOSE & COMPANY

General Order Supplier & Dealers in:

All sorts of Canes, Bamboo Root Polo Balls & Raw Products & etc. The best house for placing orders. If you are in need of anything please to book your order with.

BOSE & COMPANY.

23 Ram Rattan Bose Lane, Shambazar, Calcutta.

2186. H. Z. Oudh.—It is not possible to manufacture soap at so cheap cost. The insects that collect round a lamp during night dies at the break of day. Wants to buy catechu, betelnuts, coconuts, coconut oil and garam masala.

2187. No Name.—For manufacturing nibs, pen holders, etc. you have to use machines the working principle of which will be supplied by the machine dealers. Nib making machines may be supplied by Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta. For pen holder making machines enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lal Bazar Street, Calcutta.

2188. G. P. Cawnpore.—Ready made shirts may be bought of Jaharlal Pannalal & Co., College Street Market and East Bengal Society, 1, Mirzapur Street; both of Calcutta.

2189. B. B. M., Sibsagar.—Reply to your queries appeared in September and October issues.

2190. M. R. K., Somwarpet.—Watches may be supplied by Nivia Watch Co., Vatte & Guenin Beenut Madretsch, Switzerland; Transmarine Watch H. Buchser & Co., Soleure, Switzerland; Hamilton Watch Co., Lancaster, Pennsylvania; Keystone Watch Case Co., Philadelphia, Pennsylvania and Western Clock Co., La Salle Illinois; last three of U S A.

2192. R. S. D., Lashkar.—Process of preparing amla oil appeared in March 1926 issue. For the book write to the advertiser direct.

2193. K. A., Mirzapore.—Petroleum may be bought of Asiatic Petroleum Co., Ltd., Ballard Pier Road, Bombay; Burma Oil Co., Ltd., Royal Insurance Bldgs, Bombay; Petrol Supplying Co., Tribhuwan Terraces, Lamington Road, Bombay; Asiatic Petroleum Co., Ltd., 9/4, Clive Street, Calcutta and Shaw Wallace & Co., 4, Bankshall Street, Calcutta. Cycle accessories may be supplied by Chandra Brothers, 57, Cornwallis Street, Calcutta; Dutt Das & Co., Merchantile Bldg, Calcutta; Lamington Cycle & Motor Co., Council Patel Street, Bombay, and Wellington Cycle & Motor Co., 313, Hornby Road, Fort, Bombay.

2194. R. M. S., Katni.—Consult an engineer.

2195. S. V. G., Poona City.—For tin boxes write to Gajanand Rampratap, 6, Halsei Bagan Road, Calcutta. Refer your other query to the High Commissioner for India, Grosvenor Garden, London.

2197. P. C. S., Bangalore City.—Flour milling machineries may be supplied by T. E. Thomson & Co., 9, Esplanade East and Esplanade Co., Hongkong House, Council House Street, both of Calcutta. For rice machinery write to Marshall Sons & Co., 99, Clive Street, Calcutta. Steam engine will also be supplied by the above firm. Soap making apparatuses may be bought of Oriental Machinery Supply Agency Ltd., 20/1, Lal Bazar Street, Calcutta. Match making machines may be supplied by Bengal Small Industries Co., 91, Durga Charan Mitter Street and Bhawani Engineering & Trading Co., 122-4, Upper Circular Road; both of Calcutta. Jeweller's tools may be supplied by L. Basack, 5, Old Court House Corner, Calcutta. For selling manganese ore put advertisement in the pages of newspapers and periodicals.

2198. K. A. L., Moulmein.—Picture postcards may be supplied by City Post Card Co., 42, Mansell Street, London E. 1; Regent Publishing Co., 318, Euston Road, London N. W. 1; P. Racine & Cie, Boul Sebastopol 96, Paris, France; E. David, Cite Rougement 8, Paris, France; Photochemie G m b H. Stolpe Cheshtrasse 37, Berlin, Germany; Cunt Hoinkis, Hamburg 8, E. E. Germany and Kunstverlag Robert Hugel, Berlin S. W. 48, Germany. Refer your other queries to the Royal Society of Arts, 18, John Street, Adelphi.

2200. N. C. C., Ghum.—For lemonade powder enquire of D. Writer & Co., 43, Bow Bazar Street, Calcutta. Take medical advice.

BIRTH CONTROL

ADVICE IN AN ILLUSTRATED PAMPHLET
Of 20 Pages containing Hygienic Practical
methods approved by competent authorities
is sent on application, with a
One Anna Stamp for Postage,
To the Hon. Secretary,
BIRTH CONTROL CENTRE,
29-1, Telipara Lane, P. O. Shambazar, Calcutta.

We cannot venture opinion as regards superiority of various kinds of hair oils available in the market. Wants to know the address of 'Jhankar' a Bengali monthly and to buy a copy of 'Bhrihu Samhita.'

2201. K. V. B. S., Rajahmundry.—Wooden toys may be bought of R. Mukerjee 140, Dev Nath Pura, Benares City. Wine may be supplied by Paul Never-Burg, Linz a Rh and Hinckel Winckler, Frankfurt a Main; both of Germany.

2202. G. S. M., Toungoo.—Sugar grinding machines may be supplied by Jessop & Co, 96, Clive Street, Calcutta.

2203. M. H. P., Jamshedpur.—Ice plants may be supplied by Sulzer Brothers, 11, Clive Street, Calcutta; Giacomo Jucker, Apollo Street, Box No. 11, Bombay and Massey & Co., Ltd.; Post Box No. 60, Madras.

2204. P. L. S., Ferozepore Cantt.—Wants to be put in touch with match manufacturers of Ahmedabad.

2206. S. A., Petal.—Articles on Match Manufacture appeared in July 1922, and September 1923, issues.

2207. H. S., Bahraich.—A good recipe of hair dye in powder appeared in September 1922 issue.

2212. K. D. S., Rayadrug.—The address of Review of Review is 44 Essex Street, Strand London W. C. 2. Harper's Magazine is pub-

lished by Harper & Brothers, 45, Albemarle Street, London W. 1; Asiatic Review is published by East & West Ltd., 3, Victoria Street, London S. W. 1. Other addresses are not known. Wants to purchase old copies of Swiss Exporter. Journal Suisse, Geneva, Switzerland deals with watch making and watch repairing. Your other queries are not in our line.

2215. R. B., Rajgangpur.—Your queries have already been replied.

2216. R. V. S. S. Bijapur.—Instruments required may be had of Scientific Instrument Co Ltd, Johnstonganj, Allahabad and Scientific Supplies Co, 29/32, College Street Market, Calcutta. Powdered camphor may be bought of Madhab Chandra Daw, 4, Armenian Street, Calcutta. Please explain clearly your difficulties when we shall try to solve them.

2217. S. M. R., Muradnagar.—Process of preparing artificial slate appeared in April 1925 issue. Method of preparing slate pencils appeared in November 1925, issue. An article on ceramic industries appeared in July 1925 issue. For soap moulds and stamps write to the following engineering firms that may supply you moulds of pattern required: Bantra Engineering Works, 277 Belihos Road, Howrah and New House Engineering Works, 98, Old China Bazar Street, Calcutta.

2218. K. R., Narasarpet.—Wants to be put in touch with ghee dealers of Calcutta.

2219. B. K. T., Ajmer.—You may manufacture condensed milk. The process of manufacturing condensed milk, consists of a careful evaporation of milk, addition of sugar and sealing up of the article. The evaporation should be conducted in a vacuum to prevent the milk from becoming brown and acquiring a bitter taste. It is best to stir it constantly or the skin of coagulated casein at the top will prevent quick evaporation. When sufficiently thick or condensed it is mixed with one quarter of its weight of granulated sugar stirred well, filled in tins and soldered up.

2220. M. Y., Allonmyo.—Process of preparing cement appeared in June 1924 issue.

2221. N. L. K., Burnpur.—Without any knowledge of subject it is not advisable for you

Kaminia Oil

(Regd.)

Finest dressing for the Hair Delicately perfumed. Re. 1/- per bot. charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot. of $\frac{1}{2}$ ounce Re. 2/-, $\frac{1}{4}$ ounce Re. 1/4/-, V. P. & Packing extra.

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,

P.O. Box 2882, Juma Masjid, Bombay.

to launch upon such an adventure. First of all engage an expert who will advise according to local conditions about the merits and demerits of starting a journal on shorthand.

2222. S. R. K., Bezwada—For particulars of the joint stock company in liquidation write to the liquidator.

2226. P. C., Karcli—According to your local conditions calculate the estimates and see whether match manufacture in your locality will be profitable. As there is cheap labour and wood in your country manufacture of matches may be profitable.

2227. T. S. M. P., Tittuvilai—Take legal advice.

2228. R. S. S. P., Kottar—The same enquiry is not generally repeated. Wants to know the full address of The Starr Bell Bros. & Co., of U. S. A. Your other queries being in the nature of an advertisement should not be published in these columns.

2229. M. M., Kotri—Calico piece-goods may be supplied by Mackawa & Co., 19, Tomizawacho, Nihonbashi-ku Tokyo; Tanur Backi Ghoshi Kaisha, 29-30, Sanchome, Sannomiya, Kobe and Tamurakoma & Co., 56, Shichome, Azuchimachi, Higashi-ku, Osaka; all of Japan.

2230. D. M. H., Bangalore—For seeds and plants enquire of Sutton & Co., Park Mansion and Nurjehan Nursery, 2, Kankurgachi Lane; both of Calcutta. Recipes of white ink appeared in July 1926 issue. Consult a physician for scorpion bite cure.

2231. G. P. N., Dalman—If you go through the article on enamelling sign plates that appeared in March 1923, issue you will get a vivid idea of white enamelling.

2232. B. C. M., Bangalore—Bottles and phials may be bought of S. K. Dey & Co., 124, Shova Bazar Street, Calcutta.

2234. L. M. D., Agartala—You may go through **Commercial India**, the sister journal to **Industry**. This paper deals with commercial subjects such as current commercial news, marketing of produce, opening new business, introducing better system, etc.

2235. N. B. G., Faridpur—For rice husking machines write to C. S. Sarkar, 86/A, Narkeldanga North Road, Calcutta.

2236. G. P. M., Bombay—For securing suitable services go through the situation vacant columns of important dailies such as "Statesman," "Forward," "Bombay Chronicle," etc.

2237. H. F. B., Bombay—For correspondence course you may write to The School of Simplified Studies, 17, St. Paul's Chambers 19/20, Ludgate Hill, London E. C. 4, and Oxford Correspondence College Ltd., St. Giles, Oxford, England.

2238. P. V. R. R., Godavari—For appearing in Ayurvedic examination you may write to the Principal, Astanga Ayurveda Vidyalaya, Raja Dinendra Narain Street, Vaidya Sastrapith, Balaram Dey Street and Govinda Sundari Ayurvedic College, Ram Kanto Bose Street; all of Calcutta.

2239. M. P. O. N., Bahapatam—For starting a business with small capital go through the New Idea Columns of **Industry** where you will get many suggestions. For selling the articles you deal in, put an advertisement in the sale and exchange pages of **Industry**.

2240. P. P. P., Ellore—Process of writing on glass and painting on it appeared in July 1923 and March 1925, issues of **Industry**.

2241. N. K. V. I., Dharapuram—You may start toilet preparation. There is still a good demand for really genuine article. As regards nomenclature you may run your business under any name you like. Collapsible tubes may be supplied by B. K. Paul & Co., 113, Bonfields Lane, Calcutta. Regarding sending your articles to Indian Industrial & Commercial Congress enquire of Indian Chamber of Commerce, 20 Strand Road, Calcutta.

2242. P. C. S., Bangalore—It will be advisable for you to export ground nut seeds, oil and cake through firm exporting these articles to foreign countries. For this purpose you may correspond with Andrew Yule & Co., 8, Clive Row, Calcutta; Anderson, Wright & Co., 22, Strand Road, Calcutta; Shaw Wallace & Co., 4, Bank Shall Street, Calcutta and Indo British Co. Ltd., Ismail Bldg., Hornby Road, Bombay.

2243. S. G. D., Dina—Packing timber may be bought of Ram Chander Tatt, 10, Ram Kristopur Ghat, Howrah. For selling ochre

write to Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta

2245. S. R. G., Surat.—Waste wood of a match factory may be used as fuel. You may consult. Übersee Post, 10, Solomonstrasse, Leipzig, Germany; La Vie Technique et Industrielle, 18, Rue Seginer, Paris, France; American Exporter published by Johnston Export Publishing Co., 17, Battery Place, New York, U. S. A.; British Dominion Trade, 15, Bedford Street, London W. C. 2, and British Trade Review, 113-117, Caveron Street, London E. C. 4.

2246 M. K. A., Pachhapur.—The following is a list of perfumery manufacturers of Paris, France.—Achard Vareune & Co., Rue Ste Anne 12; Cie Francaise des Parfumeurs Orsay, Rue de la Paix 17; Parfumerie Rafin, on Victoria, 5 and Mignot, Rue Vivienne 19.

2247. P. I., Bangalore.—Match Splints and vencers are imported by C A Mohamed 15, Synagogue Street, Calcutta. Wood suitable for match manufacture may be supplied by Akita Mokuzai Kabushiki Kaisha, Noshiro-Minato-Machi, Akita-ken and Ariyumi & Co, Ltd., 13, Itchome Sumiyoshi-cho, Yokohama; both of Japan.

2251. S. P. A., Bombay.—An article on manufacturing gold and silver thread appeared in September 1926 issue. Process of cleaning gold laces appeared in April 1925, issue. Recipes of hair lotion will be found in September 1924 issue.

2252. K. K., Bombay.—Recipes of leather reviver appeared in August 1926 issue

2253. G. R., Simla.—Mitchel's book on ink manufacture may be bought of Chakraverty Chatterjee & Co., Ltd, 15, College Square, Calcutta. Brazil wood and log wood may be supplied by S. N. De, Post Box No. 7851, Calcutta. The book on Manufacture of Ink that is in the press is priced at Re. 1/8/- per copy

2254 M. L., Tanjore.—Wants to buy artificial silk and Nazira silk thread. For the machine required enquire of Textile Machinery Stores Co., 61, Apollo Street, Fort, Bombay.

2255. B. N., Rqhtak.—Hydrometer may be bought of Scientific Supplies Co., 29/32, College Street Market, Calcutta. Perfumeries and chemicals used in hair oil may be had of Sikri & Co., Post Box No. 2287 and Paradise Perfumery House, 75, Colootola Street; both of Calcutta. Porous pots are earthen pots, through the pores of which liquid may percolate under pressure.

2257. J. N. P., Sabour.—Wants to be put in touch with ghee dealers of Calcutta.

2258. A. V. S., Ambasamudram.—Treat impure gold with nitric acid when impurities will be removed and pure gold will remain. An elaborate process appeared in October 1923 issue.

2259. K. K. R., Tenali.—For securing agency of match factories write to Tallygunge Match Factory, Tallygunge, Calcutta and Guha's Lucifer Works, 23-J, Paik Para Raja Monindra Road, Calcutta.

2260. V. P. S., Madura.—Spices are exported by Inabata & Co., Ltd, Sakaisuji, Junkai-machi Minami-Ku, Osaka, Japan. Addresses of watch dealers will be found elsewhere in these columns. Copying pencils may be supplied by Valentin & Co, Hohestrasse 14, Cologne; Lyra Lead Pencil Co, Nurnberg and Hand Pencil Co., Nurnberg; all of Germany. Venus pencils are manufactured by Alpco Pencils Ltd., 173/5, Lower Clapton Road, London. Lead pencils may be supplied by Eberhard, Faber, Brooklyn, New York and Joseph Dixon Crucible Co., Jersey City, New Jersey; both of U. S. A.

2261 W. C., Bangalore City.—Fire works may be supplied by Geraer Kullerbsenfabrik Eawald Lehmann & Co., Gera, Germany.

2262. M. V. S., Cuddapah.—Reply to your queries appears under No. 2088 elsewhere in these columns.

2263. A. R. K., Panipat.—You may use air-tight corks available in the market.

2264. H. J. I., Punalur.—Sugar cane crusher may be supplied by Burn & Co., Hongkong House, Council House Street, Calcutta.

2265. M. S., Amritsar.—The following is a list of electrical and mechanical engineering colleges: The Thomson College, Roopree;

Bengal Engineering College, Shibpur; Bengal Technical Institute, Jadabpur, 24-Parganas and The Central Technological Institute, Bombay.

2266. A. S. R., Sindhanur.—Vernacular equivalents of orris root are "Irsa" "Sasun," Hindi, "Bekb sesan," "Ersa," Kashmir: "Irisa," Punjabi, "Bekhibanfsa" Persian.

2267. R. S. K., No address.—Laboratory fittings may be supplied by BeAgal Chemical & Pharmaceutical Works, 15, College Square and Scientific Supplies Co., 29-32, College Street; both of Calcutta. A good recipe of rubber solution appeared in November 1925 issue. For securing agencies and catalogues of various firms put an advertisement in the Sale & Exchange pages of *Industry*. Your other query is not in our line.

2268. M. S. L. S., Agra.—Gramophone suppliers will give you the directions for filling gramophone records. Speaking cinematograph is still in its experimental state. It has not yet come in India.

2269. H. V. P., Palitan.—Put copper in a crucible and apply heat.

2270. S. N. H., Bettiah.—You may consult Poona Agricultural College Magazine, Poona & Indian Agricultural Journal published by Thacker Spink & Co., 3, Esplanade East, Calcutta. From this office *Commercial India* and *Bread & Freedom* are published, the subscription of the first is Rs. 6/- and the subscription of the second is Re. 1/-.

2272. C. V., Narsapur.—Sewing thread may be supplied by Shah Daraza Sewing Thread Co., Hyderabad, Sind.

2273. A. M. S., Cawnpore.—Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta may supply the machines you require.

2274. R. S. Dirba.—The magical apparatuses you require may be bought of The Magical Co., Jhansi; Magic House, Nagpur City and R. C. Verma, Mohendru, Patna.

2275. B. G. M., Chanda.—For the rings required you may arrange with engravers who will engrave as per order. You may write to R. P. Ganguli & Co., 8, 9 & 10, Mati Seal Street, Calcutta.

2276. D. C. C., Delhi.—Gum arabic used in ink tablet gives the polished and smooth surface. Tablet making machines may be supplied by Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. Homeopathic books may be bought of King & Co., 83, Harrison Road; Sett, Dey & Co., 42, Strand Road and G. K. Nag & Co., 297, Upper Chitpur Road; all of Calcutta.

2277. V. J., Tatanagar.—An article on candle making appears elsewhere in this issue. Process of preparing slate pencils appeared in November 1925 issue.

2278. B. B. L. G., Najibabad.—Chemicals may be supplied by Mallinckrodt Chemical Works, St. Louis, Mo; Mutual Chemical Co., of America, New York; Park Chemical Co., Detroit, Michigan; United Chemical & Organic

Products Co., Chicago, Illinois; Western Industries Co., San Francisco, California; all of U. S. A.

2279. V. K. R., Padavedoo.—Process of extracting castor oil appeared in January 1924 issue. An article on picture frame moulding will be found in August 1924 issue. For drawing water from a well you may use pumps that may be supplied by Worthington Simpson Ltd., 10, Clive Street, Calcutta and T. E. Thomson & Co., 9, Esplanade East, Calcutta.

2282. S. S. L., Cawnpur.—Your queries have already been replied.

2284. K. R. M., Hoshiarpur.—An article on candle making appeared elsewhere in this issue. Process of manufacturing aniline and alizarine colour will be found in May 1924 issue. Other recipes you require will be found in the last volume. Dictionaries may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2285. A. C. S., Nilgris.—For protecting your coffee plants from sambars use barbed-wire fencing.

2286. J. N. C., Madras.—Process of deodorising coconut oil appeared in April 1922 issue.

2290. T. R. D., Chhindwara.—Recipes of good bar soap will be found in November 1925 issue. For soap stamping machine enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

2293. B. J., Karachi.—For radium treatment you may write to the Director, Radium Institute, Ranchi, B. N. Ry.

2294. T. D. S., Nizamabad.—Brown shellac may be supplied by S. N. De, Post Box 7851, Calcutta. Sheet metals may be supplied by Balmer Lawrie & Co., 103, Clive Street, Calcutta. Rouge powders may be had of Hanooman Prasad & Co., 2, Bonfields Lane and Kailash Chandra Dutt & Sons, 20, Bonfields Lane; both of Calcutta. For iron bars enquire of Anandji Haridas & Co., 20, Darmahatta Street, Calcutta.

2295. D. A. S., Bellary.—The following is a list of colleges of Calcutta: Bangabasi College, Scotts Lane; City College, 102/1, Amherst Street, Vidyasagar College, 22, Shanker Ghose Street; Scottish Churches College, 2 & 4, Cornwallis Square; St. Xavier's College, 30, Park Street; Ripon College, 24, Harrison Road; St. Paul's C. M. College, 33/1, Amherst Street and Presidency College, 86/1, College Street. There are only two notable Colleges in Delhi, Viz, Hindu College and St. Stephen's College.

2296. G. V., Narasapur.—For industrial books enquire of Chackraverty Chatterjee & Co., Ltd., 15, College Square, and Thacker Spink & Co., 3, Esplanade East; both of Calcutta.

2297. J. J., Cocanada.—Wants to buy aluminium powder.

2298. B. G., Madura.—For selling cardamom you may correspond with Madhab Chandra Daw, 4, Armenian Street; Banshidhar Dutt,

126, Khengraputty, Bara Bazar, and Jadu Nath Ghar, Hukaputty, Barabazar; all of Calcutta

2300. S. K. D. C., Calcutta.—Vide No. 2178 above.

2302. C. V. C., Kumbakonam—Lino-typing is taught by Lino-type Co. Ltd, Bow Bazar Street, Calcutta

2303. D. R. Vizianagram—Small cinema machines may be bought of Calcutta Camera House, 158, Dharamtola Street, Calcutta. Mergolized wax is a patent article recipe of which is trade-secret. You have misunderstood the rules of New Idea Prize Competition. Names of the prize winners are published in the columns of **Industry** at the end of the year.

2304. S. V. A., Bhandara—Recipe of the patent medicine you want is not known to us.

2305. S. C. C., Agra—For motor cars and lorries enquire of Allenberry & Co. Ltd, 24, Park Street; Ford Motors Ltd, 110/1, Russa Road; M. T. Ltd, 59/60, Chowringhee and Great Indian Motor Works, 25-29, Park Street; all of Calcutta.

2307. P. S. K., Mainpur—Glass sheets and picture frames may be bought of Fotic Lall Seal & Sons, 16, Swallow Lane, Hem Chandra Chandra, 10, Swallow Lane and Kanay Lall Dhar, 11, Swallow Lane; all of Calcutta

2308. K. S. Kandy—Your previous letter is not traceable. Please repeat your queries.

2309. A. K. C., Vizianagram—Leather goods may be supplied by W. S. Dossen & Co., Post Box No. 7864, Calcutta; Sircar Bros., 64, Russa Road, Calcutta; Calcutta Industrial Leather Works, 1, Pollock Street, Calcutta and National Tannery, Martin & Co., Clive Street, Calcutta.

2312. S. C. M. T., Bargarh—For brass pipes enquire of W. Leshe & Co., 19, Chowringhee Road, Calcutta. For brass sheet enquire of Bahuer Lawrie & Co., 163, Clive Street, Calcutta.

2313. M. R. A., Mahabpur—Eye glasses and spectacles frames may be supplied by Stephens & Co. Ltd, 275, Bow Bazar Street and Lawrence Mayo Ltd, Old Court House Street; both of Calcutta.

2314. G. S. V., Ootacamund—Knitting machines may be supplied by W. H. Brady & Co., 26, Strand Road, Calcutta, and M. Hriday Narayan, 32, La Touche Road, Lucknow.

2315. U. C. J., Meerut City—Collapsible tubes may be supplied by Venesta Ltd, Great Tower Street, London, E. C. 3; Brooks Peel & Co. Ltd, 24, City Road, London, E. C. 1 and Betts & Co. Ltd, 41, Wharf Road, City Road, London, N. 1.

2316. V. G. C., Berhampore—Glass sheets may be bought of P. A. E. Thiruvarangiah & Co., 103, Devaraja Mudaly Street, Madras; Glassware Trading Co., 4/5, China Bazar Road, Madras and Nand Lal Dass & Bros., 194, Old China Bazar Street, Calcutta. No other reliable address is known.

2318. B. C. D., Andheri.—Recipes of match compounds will be found in **September 1923** issue. Match splints and veneers may be supplied by Tallygunge Match Factory, Tallygunge, Calcutta; C. A. Mohamed, 15, Synagogue Street, Calcutta. Match chemicals may be supplied by Champaklal Bros., 72, Canning Street, Calcutta.

2319. K. S. N. Madras.—Your query being in the nature of an advertisement should not be published in these columns.

2320. V. V. S. R., Kurnool—A good recipe of litho ink appeared in August 1922 issue. For books on litho printing write to Thacker Spink & Co., 3, Esplanade East, Calcutta.

2321. H. P. C., Patna—Tattoo marking apparatuses may be supplied by Bose & Das Co., 28, Nilmoney Mitter Street, Calcutta.

2322. C. J. H., Sholapur.—To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected.

2325. S. J. F., Fdappalle—Umbrella making is a paying industry no doubt. But it requires special knowledge to manufacture umbrellas with fittings. In the beginning engage a mistry who can adjust all the parts of an umbrella. Rs. 10,000 will be a sufficient amount to start umbrella making with fittings. Umbrella fittings may be supplied by Nafar Chandra Atta, 43, Armenian Street, Calcutta. German addresses of umbrella fitting dealers will be found in November 1926 issue of **Commercial India**, the sister journal to **Industry**.

2326. I. I. P. S. C., Kurnool—Matri Bhandar, Sreemani Market, Coinwallis Street, Calcutta deal in Swadeshi goods only.

2328. N. A. R., Filore—Tin pots may be supplied by Gajanad Rampratap, 6, Halsei Bagan Road, Calcutta.

2330. K. A. H., Banganapalle—Match making machines may be supplied by Bengal Small Industries Co., 91, Durga Charan Mitter Street, Calcutta. Soap moulds may be had of Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta.

2333. T. N. D. R., Calcutta—The chemicals mentioned by you are to be had of C. Biswas & Co., 125, Bowbazar Street, Calcutta.

2334. S. L. K., Banamapla—Mercury can be solidified by lowering its temperature or increasing atmospheric pressure. A formula for luminous paint appeared in the October issue. The manufacture of celluloid articles is a very costly affair, as celluloid is a highly explosive substance. Consult Scientific American Formulas by Hopkins, which may be had of Chuckervertty Chatterjee & Co. Ltd, 15, College Square, Calcutta. The possibilities of Hair Oil Manufacture depend on local market and raw materials. In order to become an expert in cap making you ought to serve a term of apprenticeship. Wants pulverised cotton, wool and silk. Answers to your other queries will appear in an early issue.

NOTICES AND REVIEWS.

Magical Appliances.

We have received a packet containing 10 magic tricks and puzzles with a booklet of instructions from Messrs. J. N. Opal & Co., Dealers in magical apparatus, conjuring tricks, jokes, novelties, indoor games and the like. These are highly interesting.

Hair Curler.

It is claimed that Pissay Curler turns the head into a mass of waving hair, making permanent curls overnight. It may be had of Sri Venkateswar Stores, Guntakal.

Fresh Spices.

Judging from the samples furnished to us the cardamoms (nunot) which Mr. B. S. Ganeswaram, Raunapuram, Uthamapalayam P. O., Madura Dist., can supply in large quantities are of choice and fresh quality.

Journal on Rural India.

Rural India, No. 9 Brodie's Road, Mylapore, Madras. Annual subscription Rs. 3/- This monthly journal of the Madras Forest Panchayats deals with subjects relating to rural welfare of India such as agriculture, co-operation, etc.

Dewali Greetings.

It is with heartfelt thanks that we reciprocate the greetings with which the Nectar Tea Company, Mettupalayam, Nilgiris, have complimented us on the occasion of Deepavali. May their business prosper more and more.

A Progressive Insurance Company.

Going through the prospectus of the Asiatic Insurance Co., Ltd., of 5 Commercial Buildings, Calcutta, we learn that it is established on a true scientific basis on the lines of the industrial insurance companies that are working amongst the labour and the middle classes in European countries. Of noteworthy features it might be mentioned that their premiums are exceptionally low and the Board of Directors comprise busi-

ness men, as will appear from an advertisement appearing elsewhere. We wish the company all prosperity.

The Nature Healer.

As usual the October issue of *The Nature Healer* is replete with instructive articles on health and hygiene which will be read with profit. A wide range of subjects from psychology to physiology is dealt with. The office of this progressive journal on Naturopathy is at 20/A, Kaliprosad Chakrabarty Street, Baghbazar, Calcutta.

Ink Powder.

Mr. M. Viswanadham, 34, Nyniappa Maistry Street, P. T., Madras has sent us samples of "Tilak Ink Powders" in five brilliant shades contained in a nice little wallet. We are glad to record our appreciation of these inks manufactured by Rashtriya Kala Bhuwan.

Picture, Post Cards.

We have received from Mr. N. V. Kale, (unvasser, Post Naragal, Dist. Dharwar, some picture post cards (Lokmanya series and others) published by Messrs. Joshi Bros., Bazargate St., Bombay.

An Indian Invention.

One of our esteemed correspondents has been trying for the last eight years to invent a new type of spinning machine which will be a great improvement upon the *Charka* and at the same time be suitable for cottage industries. It is a cotton yarn spinner which will be equipped with 50 twistors, the latter being his own invention as special spinning appliances. There are several ingenious and automatic features in it which will effect mechanical efficiency and insure great economy. That the scheme is eminently feasible is corroborated by the fact that the U. P. Government advanced Rs. 2,000/- to enable the inventor to carry on the researches. Having finished the experimental works our correspondent approached a consulting engineer with a sketch who has certified

that the machine if built will be a great achievement. But after a long period of hard struggle pecuniary conditions have stood in the way of practical realisation. He therefore appeals to those who are interested in the invention for financial assistance on favourable terms. For particulars our readers may write to Mr B. P. Srivastava, Vil. Mustafabad, P O Majharva-meer, Dist Basti, U P

A Vernacular Magazine.

"Gian Udaya" is published from Kagzi Bazaar, Karachi. Annual subscription Rs. 2-0-0 only. It is the only religious, historical, social and industrial monthly in Sind and Baluchistan.

Trade Enquiries.

[To communicate with any party write him direct with name and address given below, mentioning **Industry**.]

2261. Witt & Co, 134, Sixth Cross Road, Shankerpur, Baswanqudi Post, Bangalore City.—Wants to be put in touch with toy manufacturers of Pondicherry, Karikal and Bengal.

2262. Mohamed Abdul Shukoor, Cuddapah.—Desires to be put in touch with indigo merchants of Kabul and Punjab.

2310. Patel Sons, Patea Mansion, Shop No 5, Bhindy Bazar, Bombay.—Wants to be put in touch with cap merchants of Calcutta.

2319. K. Srinivasulu Naidu, 16, Guruswamy Naidu Street, Madras.—An expert in dyeing cotton, silk, etc., in manufacturing inks and various chemical industries wants a capitalist to start one of the above businesses.

2383. Sardar & Co, Belanganj, Agra.—Desire to be introduced to dealers in stag horns, honey, lac and jam.

2400. Dr. Nasir Ahmed, Tadepalligudem, W. Godavari.—Wants to buy books on crochet and lace.

2415. G. John Thathayya & Sons, Amalapuram, Godavari.—Want to be put in touch with suppliers of tiger's skins. Can supply coconut and lace.

2430. M. G. Ganesh, 14, Erulappan Street, Madras.—Desires to be introduced to suppliers of crocodile, lizard, python and squirrel's skins.

2433. R. Muttiah, 1, Hugh Low Street, Ipoh, Perak, F. M. S.—Wishes to be put in touch with Indian exporters of shark fins and silk cotton commonly used for mattresses, pillows, etc.

2440. Ram Behari Lal, Room No. 8, Old House, The College, Meerut.—Wants to be put in touch with buyers of potato flour.

*2456. Attili Suryanarayana Murthy, Bellarybharani, Godavari.—Can supply fresh ropes.

2484. I. P. Export Co, Post Box No. 212, Madras.—Desire to be put in touch with dealers in palmyra fibre, senna leaves and buffalo horn.

2502. K. S. V. Nath, Sivaganga.—Wants large quantity of Salamisiri.

2520. India Products Export Co, Post Box No. 217, Madras.—Wants a supply of Indian whisk root, bear and tiger's skins.

2534. J. Veerabhadra Rao, C/o. D. L. Sastri & Co, Vizianagram.—Wants a capitalist partner with Rs. 20,000 to invest in the preparation of paints, colours and varnishes.

2536. The Delagoa Bay Commercial Traveller's Agency, Box 26, British Transvaal.—Work as advertising agent for a large number of South African newspapers and periodicals.

DECEMBER ISSUE OF INDUSTRY.

(In the Press)

The December issue of **Industry** which will appear on the last day of the month will be a Special Number on Agricultural Industries. The subject will be exhaustively dealt with and profusely illustrated. Besides, it will contain the regular features such as Formulas & Processes and Small Trades & Recipes etc. Any friend of our subscribers may get a copy free as sample on application to the Manager, **Industry**, Shambazar, Calcutta.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows.—

Indian Rs. 3/- Foreign Rs. 5/4/-

The charge is for complete yearly volume only, inclusive of postage. V. P. and Registration fees are separately charged.

BUSINESS NOTICE.

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

Manager **INDUSTRY OFFICE**,
Shambazar, Calcutta.

IF YOU WISH TO IMPROVE YOUR ENGLISH

DO AS I ASK YOU TO DO:

Take your pen. Cut out a sheet from your writing pad. Write on it your full name and address. If you are living in a village, be sure you add the district as well. If you have in view any Commercial or University Examination, mention it. Give me some idea of what you are and what you wish to be. Omit nothing that may be of help to me in planning a special course to meet your needs. Address the envelope thus:

To, The Director,

THE SCHOOL OF ENGLISH,

Department 11.

POST BOX NO. 20, G. P. O. POONA.

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Messrs. BRIJMOHAN & CO.,
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TO ALL AMBITIOUS MEN

THOSE WHO ARE PLANNING FOR FUTURE SUCCESS IN THE INDEPENDENT
CAREER OF THEIR LIFE THIS VALUABLE BOOK

MONEY MAKING BY THE MAIL.

Opens out a rich way of immense and ever increasing possibility.

HOW CAN I ? ?

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- Handle my advertisement for mail order advantages
4. Arrange my catalogue.
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6. Prepare mail order follow-ups.
7. Know purchasing mind
8. Fix selling price.
9. Talk to prospective customers.
10. Prepare mailing list.
11. Make my list cumulative.
12. Know the mail order technique.

Are these questions yours
—If so, get a copy of Money
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THE WINTER EARNINGS ARE UPON YOU
READ THIS BOOK AND PLAN YOUR
CAREER NOW FOR THE TIME OF
STRESS. IT REVEALS THE SUREST MEANS
OF SECURING PRACTICALLY EVERY PRIZE
OFFERED BY THE BUSINESS WORLD

GET INTO MAIL ORDER BUSINESS.

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FOR YOU—THERE IS MONEY IN IT FOR
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COMMENCE study—practice now, for the
present is the ideal time. Avail yourself
of these illuminating pages to lay the founda-
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of—cheerful prosperity.

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INDUSTRY

WILL BE ANOTHER SPECIAL NUMBER

AGRICULTURAL INDUSTRIES

WILL BE SPECIALLY TREATED IN THIS
LAST SPECIAL NUMBER OF THE VOLUME.

AND IT WILL HAVE WIDE CIRCULATION

IN THE COUNTRY SIDE AND WILL BE KEENLY
READ BY PEOPLE WHO HAVE ANY INTEREST
IN THE COUNTRY AND ITS AGRICULTURE.

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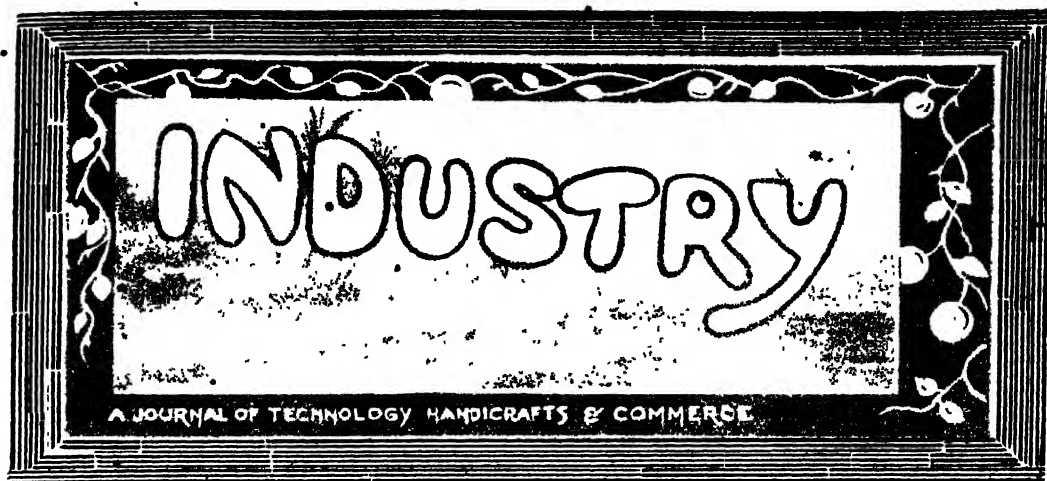
INDUSTRY

KESHAB BHABAN,
SHAMBHAZAR, CALCUTTA.

AGRICULTURAL-INDUSTRIES SPECIAL.

Managing Editor.—K. M. BANERJEE.

Vol. XVII. No. 201, DECEMBER, 1928.



INDUSTRY OFFICE:—Keshul Bhaban, Shambazar, Calcutta.

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So write the Wilson Watch Co., Asian Building, Ballard Estate Bombay on Sept. 22, 1926.

THE HUGE SUBSCRIPTION LIST GIVES ADVERTISERS A PERMANENT AND RESPONSIVE AUDIENCE.

ASK ANY ADVERTISER AND BE SATISFIED

Our Mission Is To Increase Your Trade.

Industry Book Dept,

**Keshub Bhaban.
Shambazar, Calcutta.**



VOL. XVII.

CALCUTTA, DECEMBER, 1926.

NO. 201.

AGRICULTURE AS A PROFESSION.

BEARING in mind that more than 70 per cent of the people live directly or indirectly on the produce of the soil, agriculture should form the most important issue in any scheme of industrial renaissance in India. That agriculture in this country needs great improvement in respect of cultivation, irrigation, manure, etc., is admitted on all hands. There is considerable work to be done in this line so that actually the tillers of the soil might be benefitted. Improvement of Indian agriculture would incidentally, give occupation to thousands of educated Indian youths by bringing into vogue numerous side industries.

First of all, a number of chemists can take up soil analysis. There are various kinds of soils, good and bad, and they can suggest correctives, such as lime for sour soil. Similarly others may take to manure analysis and determine, say, the percentage of nitrogen in oil cakes. In agricultural estates, such as tea and coffee, huge quantities of manures are consumed. They can manufacture artifi-

cial fertilisers, suitable for flowers and vegetables. Animal bone and other products are prolific source of manure.

The agricultural chemists should also prepare for sale insecticides and fungicides and thereby assist in exterminating troublesome pests.

Agricultural engineering will also be a suitable avocation for enterprising young Indians. Some might deal in agricultural implements suited to Indian conditions such as small motor tractors, mechanical harrows, reaping machines and the like. Even small accessories are capable of manufacture here.

In this connection irrigation should be also taken up. Hand pumps, water lifts, etc., should be freely used. One should also try to utilise water and wind power by installing windmill and water wheel.

Next come seedsmen in importance who have to deal in agricultural and other seeds—always from fresh stock. These should be either collected from reliable source or raised by themselves.

Vegetable and flower seeds should be tested and tried in experimental beds; those of foreign countries should be acclimatised as far as practicable.

Nursery men should raise plants from seeds or by grafting. They should scientifically classify the trees so as to be able to supply plants true to name and description.

The function of horticulturists should comprise hybridisation of plants; culture of new strain and so on. Some of the noted Indian fruits are fast deteriorating, such as mango and lichee and these require immediate attention. They should specialise in this line.

Orchards on a large scale should be started to ensure a constant fruit supply to the town where there is a growing demand for fruit. The successful orcharding in Kulu and Bangalore would serve as example for more.

The canning and preserving of fruits and vegetables can be taken up as a simple but lucrative home industry. Indian pickles, chutneys and morabbas will find a ready market all over South Asia, if not in remoter countries. With improvement in packing and speedy transport the luscious fruits, like the mango and pineapple, can be exported to foreign countries in a ripe state. There is a demand for banana in the Continent of Europe.

The business in cut flowers for decoration, etc. is a remunerative one for florists.

Flower gardens, besides supplying cut flowers,—will be a source of essential oils, such as lavender. Many are the pure scents that can be distilled from flowers.

Drug collection from the remote tracts of the country is a profitable business; but they should be botanically identified. Collection of orchids from hill sides offers at once adventure and pleasure; moreover they fetch fabulous prices.

The field for intensive cultivation and extensive farming holds out unlimited

prospect. They will yield both pleasure and profit if launched upon with prudence. Investments in agricultural estates like tea, coffee, cocoa, etc. and tropical plantations like rubber, chincona, etc. are financially sound. The multifarious utilities of coconut and banana are too widely known to need any description here. The products to be derived from them are too numerous to enumerate. Those who are fond of innovation may introduce certain profitable crops such as hop and beet for making yeast and sugar respectively.

There is immense possibility in the development of agricultural products. Well-known industries directly connected with agriculture comprise rice husking, wheat grinding, oil milling, and the like. But attention should be directed to more valuable sources for by-products such as instanced here. Papain, otherwise known as vegetable pepsin, is derived from the milky juice of papaw; oxalic acid from tamarind pulp; tannin is extracted from the myrobalans. Coconut butter is a fine example in up-to-date vegetable oil industry. It is considered as a good substitute for ghee which is daily growing scarce. Other vegetable oils may be converted into solid vegetable fats by the process of hydrogenation.

It pains one's heart to learn how in a poor country like ours many agricultural products are wasted. These could be easily recovered by adequate organisation. To cite an example, palmyra fruits are allowed to accumulate knee deep in South Indian forests and putrefy instead of being converted into sugar. Similarly prolific date palms in the Central Provinces only remain to be tapped to yield the finest jaggery.

Agricultural wastes should be carefully utilised, such as banana skin and orange peel in the preparation of essential oils. Banana hooks can be burnt and the resulting potash worked into the soil to enrich it. Similarly a use may be found for hyacinth as a manure thereby getting rid of an otherwise persistent evil.

AGRICULTURAL INDUSTRIES.

LARGE variety of crops is cultivated in India than in any other country of the world. There are fourteen cereals of which rice and millet are most characteristic of the Indian climate, since, if uncultivated by man, they could survive in a wild condition. The varieties of rice are almost infinite in number, but they can all be referred to a single species, *Oryza Sativa*. The coarser and quicker growing varieties are grown from broad-casted seed: the finer kinds from transplanted seedlings.

Rice generally needs to stand in water during a period of its growth, and rice fields are accordingly levelled and embanked and therefore, lose little of their fertility by surface drainage. Maize has been introduced from America within the last three centuries, and has taken an important place in agricultural economy. Three other cereals are of great importance—wheat, barley and oats. Their cultivation is confined to Northern India where the season offers them favourable conditions for growth. There are nine distinct species of millet. The large millets are *juar* or *chulam* and *bajra* or *cumbu*. Of the small millets the most important are *mandwa* or *ragi* and *kodon* in appearance resembling rice. These are the main staples of the hilly country in the South and centre of the peninsula.

For the supply of nitrogenous food there are thirteen species of pulse. The most characteristic of these is the pigeon pea (*arhar* or *tur*). Three species of *phaseolus* are widely cultivated, generally

as a creeping under-growth to cotton or millet. Four pulses are cold weather crops. The principal of them is gram, the others are lentils, field peas, and the chickling vetch. The latter is grown principally for cattle food.

Oil-yielding plants are of great importance to the subsistence of the people and they also contribute materially to the exports of the country. Seven kinds are grown, two of which, linseed and rape, are widely known. The oilseeds which are most typical of India are the sesame (*til* or *gingelly*) and niger seed. Castor oil plant is grown in cottage gardens, and as a border to crops of cotton and millet. Its oil was, until the introduction of kerosene, the common luminant of the villagers. Groundnut is cultivated for export with rapidly increasing popularity.

Four plants are cultivated for their fibre. Chief of them is cotton, which appears to be a typical Indian plant and to have been derived from a wild cotton that is indigenous to the country. The very numerous Indian varieties can conveniently be grouped into two classes, the former kind yielding the longest and finest fibre. The cultivation of jute is localised to Eastern Bengal, where in tall dense masses of vegetation it stands out above the level sheet of rice. The stalks are steeped in water for about three weeks, when the bark can readily be stripped off by hand. Practically the whole of the jute crop is exported. Two other fibre plants, *Sonai* and *Patsan* supply the cultivators with materials for rope.



1. Winnowing Corn.

The sugar cane has been cultivated in India from the earliest times. Indian sugar is in its most characteristic form a mixture of sugar crystals and molasses, obtained by boiling down the cane juice and for some centuries past refined sugar has also been manufactured by straining off the molasses. Sugar refineries on modern lines have been established.

Three narcotics deserve mention—the opium poppy, tobacco and hemp. The poppy is a cold weather crop requiring very careful cultivation. The opium exudes as a juice from the seed capsules when scored by scratches. Tobacco was introduced into India by the Portuguese three centuries ago. In some localities the tobacco plant grows exceedingly well, and Indian cigars have of late years secured a market in England. The narcotic yielded by the Indian hemp plant is preserved by two different ways—by simply drying the leaves (bhang), of which an infusion is made for drinking, and by gathering and pressing the female flowers (ganja).

Tea, coffee, cinchona and indigo are mainly the fruits of European planting enterprise; they are grown under European supervision with capital supplied from Europe. Efforts to introduce tea planting into India date from the commencement of last century. It has concentrated itself in Eastern India—in the two valleys of Assam and on the slopes and at the foot of the eastern

Himalayas. Coffee was introduced some two centuries ago by a Mahomedan pilgrim returning from Mecca. Its cultivation has succeeded only on the hills of Southern India. The cinchona tree (introduced from South America) is grown for the production of quinine and cinchona in the eastern Himalayas near Darjeeling and in the Nilgiri hills of Madras. Most of the area planted in both localities is owned and worked by the State for the provision of quinine for the medical department, and for distribution to the people at a price very much below that which private manufacturers would accept.

CEREALS.

RICE

Rice is the staple food of most of the oriental people. Rice in the husk is known as 'paddy.' Before it can be used for food this husk must be removed; this is done amongst the poorer people by rubbing the grain between flat stones, and winnowing or blowing the husks away. On a large scale rice husking machines (rice-hullers) are employed. In England rice-straw is plaited for

bonnet. A spirituous liquor (arrack) is distilled from rice.

WHEAT.

When wheat is crushed between the stones of the mill, it is separated into two parts, the bran and the flour. Bran is used for fattening the stock on the farm, and is of some commercial value in tanning, calico-printing, for filling dolls, cushions, etc. Flour is used for making bread.

OATS

The meal of this grain is remarkable for its richness in gluten, and for containing more fatty matter than any other of the cereals. To these two circumstances it owes its nutritious and wholesome character.

BARLEY

Barley is chiefly used for malting and distilling purposes, in making beer and spirits. When the outer coat of this grain is removed, it is called pearl barley, and in this form it is valuable for thickening broths and soups. Barley water is a mucilaginous drink for invalids, made by boiling pearl barley.

MAIZE.

Like the other cereals, maize may be reduced to meal, the coat of the grain or bran remaining mixed with the flour. Starch is made from it. In the preparation of homily, the grain is first soaked, and then exposed to a dry heat, which causes the bran or outer coat of the grain to crack and peel off, when it is easily separated.

VEGETABLE OILS.

Vegetable fats and oils play a very important part in many modern industries, thus, for instance they are

employed in the manufacture of soap, candles, and glycerine, in the preparation of margarine and edible fats, in medicine, and in the production of paints and varnishes. The extent to which they are employed has increased to an enormous extent during the last few years, which may be regarded as partly due to a better knowledge of their properties; and also to improved methods of extraction and purification.

Fats and oils are among the most widely distributed of vegetable substances, being met with in large quantities as reserve or nutritive material in fruits and seeds. They are either fluid or solid at the ordinary temperature. In the former event they are termed oils, in the latter tallow.

The uses to which vegetable oils and fats are put are tabled below.—

GROUNDNUT OIL.—For alimentary purposes like olive oil. Technically in



2. Preparing Cereals.

the adulteration of olive oil, soap making etc. '

CASTOR OIL.—Medicinally as a purgative. Technically as a lubricant, for the manufacture of soap, in dyeing, leather dressing etc., also for the manufacture of soluble or Turkey red oils.

COTTONSEED OIL.—Alimentary purposes: as an edible oil, by itself, for adulterating olive oil, for the preparation of lard substitutes; artificial ghee and butter.

Technical purposes:—As a lubricating oil; for making soap and candles, for painting, burning etc.

TIL OIL.—Used for medicinal and cosmetic purposes and also for alimentary purposes. Technical: as lubricating oil, either alone or in conjunction with other oils. Also for soap making, the manufacture of Turkey red oil, etc.

KAPOKSEED OIL.—Locally for alimentary purposes also to some extent in Europe for soap making in place of cotton seed oil.

RAPE OIL.—Rape oil is used technically as a lubricant and illuminating oil,

as an adulterant to higher priced lubricating oils, and in soap making, etc. '

MUSTARD OIL.—Alimentary purpose; technically as burning oil.

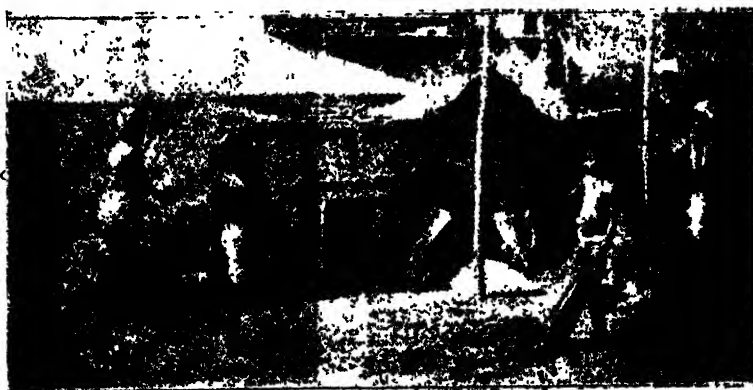
LINSEED OIL.—Medicinal for plasters: alimentary as mustard oil and solid fats; technical, chiefly for making oil colours, varnishes and lacquers, also for soap making.

POPPYSEED OIL.—Alimentary purposes. Technical; in the manufacture of soaps, as lamp oil, and as a matrix for colours in oil paint and colour making.

SUNFLOWER OIL.—As an edible oil, like olive and other vegetable oils. Technical, in the manufacture of soaps, and in paints in place of linseed oil.

NIGERSEED OIL.—Alimentary: in this country the oil is used as food by the poorer classes. Technical: as burning oil, also as a lubricant and, for soap making.

HEMPSEED OIL.—For alimentary purposes; same as olive oil and fats when fresh. Technical: as a burning oil, for soap making and in the preparation of oil colours and varnishes.



3. Threshing Rice.

COCONUT OIL.—Alimentary purposes in the production of an edible fat. Technical in soap and candle making.

EDIBLE FATS.

Bassia Tallow, also known as Mohwah butter or Mowrah seed oil is expressed from the seeds of *Bassia longifolia* whilst a similar fat, obtained from the seeds of *Bassia latifolia*, is known as Mahua butter or illipe butter, the commercial product usually consisting of a mixture of the two fats. Another product, known as phulwara butter, is derived from the seeds of an allied species, *B. butyracea*, whilst the Dyaks of the Malay Peninsula separate an edible fat from the seeds of *Buchanania latifolia* which closely resembles mahua butter in its characteristics.

ESSENTIAL OILS.

The various distillation products obtained from the wood, fruit, leaves, and grasses growing in the forests comprise such products as cutch, wood-oils, charcoal, grass oils, and extracts such as camphor, Mohwa liquor, cinnamon oils, etc.

The most important oil grasses are the Rosha grass, *Cymbopogon Martini*, and the Lemon grass, *Cymbopogon citratus*, both yielding perfumed oils.

Rosha grass occurs chiefly in the Central Provinces, Nimar, Berars, and the Khandesh Satpuras of Bombay. Its occurrence is local, but where present it forms a dense undergrowth in the forests.

Lemon grass occurs chiefly in South India, and produces what is known on the

market as Travancore Lemon grass oil, used in perfumery work, such as scenting soap.

By distillation certain woods yield wood oils (as distinct from exuded products). The most important from a commercial point of view, are sandal wood oil and agar oil, while the Deodar, Teak and certain Pines yield tarry substances of economic value, especially the first named.

Though sandal wood is found chiefly in Mysore and to a smaller extent in the South of British India the extraction of the oil is carried on outside these producing areas, to a very large extent in Oudh.

Agar-agar oil is obtained from the wood of *Aquilaria Agallocha*, the Eagle or Agar tree of Bhutan, Assam, Khasia Hills, Eastern Bengal and parts of Burma. Only very small portions of the tree are found to yield the highly resinous wood, containing the aromatic



4. Drying Copra.

juice from which the drug is obtained. The oil extracted from the wood is known as Agar-attar, and is used as a scent. The portions impregnated with this oleo-resin are burnt as incense.

Cedrus Deodara, from which is obtained a black oil, smelling strongly of tar, is used in skin diseases, for fly-bites, and in cases of rheumatism. Looking to the enormous waste occurring in the conversion of Deodar sleepers and also in the richness of this tar oil, there would appear to be an opening for the preparation of this oil on commercial lines.

THE PALMS.

The number of known species of palms is over one thousand, chiefly indigenous to tropical regions. There is scarcely any family of trees that are more generally useful in tropical climates than the palm tribe. Many a single member of the family possesses special and important economic uses, rendering it invaluable to the local inhabitants. Numerous races depend almost entirely upon the palms for many important products; wood and leaves for habitation, bark and leaves for fabrics and cordage, buds and fruit for food, and sap for sugar and spirit.

COCONUT.

The Coconut palm is one of the most useful trees of tropical regions; all its parts are utilized, but its fruit is the most important product.

From the fruit is obtained many articles of luxury and trade, thus first, the husk. After the thick green external pellicle is stripped off the shell it is placed to dry in the sun; this being fibrous, is beat into a sort of hemp and is known in this state by the name of coir

It is spun into cables, ropes and yarn of every dimension and size.

The kernel produces oil by boiling it in water, after it has been pounded or rasped. Grated a sweet milk is obtained, and by various preparations, jelly, copra, butter, candles, and sugar are produced, and, by fermentation, vinegar. The oil it yields is used in cooking but it soon becomes rancid, when it is burnt. The kernel is also used as a fattening substance in the dairy and aviary.

The fibrous husk is not its least valuable product. Instead of being formed into rough cordage only and mats made by hand, the fibre is rendered sufficiently fine for the loom, and matting of different textures with coloured devices is produced while a combination of wool in pleasing design gives the richness and effect of rugs and carpeting. Brushes and brooms for household and stable purposes, are some of the uses of the fibrous coating of the coconut.

PALMYRA

In Madras Presidency sugar is extracted from the sap of the palmyra palm. The young flowering branch is cut off near the top, and an earthen pitcher tied on to the stump. The sap runs into this pitcher which is emptied and replaced every morning after the stump has been again cut and this process is repeated until the supply of the sap has been completely exhausted. Powdered chunam (lime) which has the property of preventing fermentation is sprinkled on the outside of the earthen vessel in which the sap is collected. The juice is then boiled down and the sugar obtained on drying the sediment by exposure.

DATE PALM.

Phoenix, the genus to which the date palm belongs, comprises nine known species, of which six are indigenous to India. Here the date palm is stunted in its growth by extraction of its juice for sugar. The fruit, indeed, consists more of seed than of pulp.

The useful products of the date palm are, however, numerous. The leaf stalk is employed for fences, and other supports. The tow from the leaves is spun and used for stuffing saddles and serves as tinder. The fibre it yields is of use as a textile material; if it are made ropes for wells and cordage for vessels as it is not impaired, by sea water. The fibre is obtained from the terminal shoot of the tree and also from the leaves. The pendicle which bears the fruit yields a very strong thread, of a silvery white, resembling that of the agave, which is used in the baths as a friction rubber. From the split leaves of the palm, or with its folicles, mats and baskets are made, as well as chairs or seats. The trunk is employed as posts. The wood is compact and easily cut into thin planks, which take a fine polish. From the unripe fruit, spirit and vinegars, and syrup or molasses, can be made. The crushed kernels or seeds of the fruit are given as food to domestic animals.

PLANT PRODUCTS.**STARCH.**

Starch is the common name for the fecula or any laceous matter washed out from different parts of several plants, such as the seeds, roots, and cellular tissue of the stems. It is one of the

most abundantly diffused of all proximately vegetable principles. Some kinds of starch are prepared for application in the arts, and by the laundress for stiffening linen; others are more powdery, and are used for food, such as the arrowroots and corn flours; others again are granulated like the sago and tapiocas.

The colour of starch is usually pure white; in some cases a tinge of blue can also be seen, as in some wheat starch, while that from the potato has a slightly yellowish cast. The fineness of the starch powder depends on the size of the individual grains, except where the grains are artificially agglomerated, as in sago and tapioca; the former is the small, round, white or brownish grains, while tapioca is in larger, irregular, white fragments.

ARROWROOT.

In arrowroot, tapioca, and sago, starch exists in a state of almost absolute purity. The arrowroots are bruised, thrown into a vessel of water, and well stirred, when the fibrous portion comes to the surface, and is rejected, the starch settling at the bottom of the vessel as soon as the fluid is permitted to rest. This, after repeated washings, is dried in the sun, and constitutes the arrowroot of commerce, so much employed as a nutritive diet for invalids and young children.

TAPIOCA.

Tapioca is another form of starch obtained by grating and washing the roots of this plant, which under the name of manioc or cassava forms a most important article of food. This washing



5. Rope-Making from Coir.

removes a narcotic poisonous principles which exists in the sap. The starch thus worked, softened by heat, and afterwards granulated, constitutes tapioca.

The common starch of the market, used in domestic economy, is obtained from wheat, rice and potatoes and is almost easily made.

SAGO.

Sago is obtained from several species of palm. It is obtained from the cellular tissue, or pith, in the interior of the trunk. It is manufactured as follows. The pith, which is soft, white, spongy, and mealy, is first removed from the interior of the stem, then twisted, and put into large tubes of cold water; the woody particles, of course, float, and are easily removed, and the weightier starch or sago powder settles at the bottom of the vessel. The water is then poured off, and the dried sago powder passed

through small sieves made of the fibres of the palm leaves.

In passing through these sieves, the sago powder acquires its granulated character. The preparation is then finished, and the sago is ready to be put into boxes, or placed in bags, for shipment.

SUGAR.

The sugar of commerce is an artificial article, like distilled liquors, yet the saccharine principle, a distinctive element of food is formed in almost all the plants we use, especially the most valuable. Cane sugar occurs abundantly in the sugar cane, the sugar grass, several varieties of maple, in beet roots, mangels, carrots, turnips, pumpkins, chestnuts; and many other plants. Grape sugar is found in fruits, especially when they have been dried and kept for some time; and this sugar is produced from starch by the action of sulphuric acid, and during the germination of seeds. Fruit sugar, or fructose is found in a great variety of fruits, and cane sugar is converted into this substance by prolonged boiling.

AGRICULTURAL BY-PRODUCTS.

(1) From Oil Seeds.

Linseed cake is deservedly one of the most popular feeding stuffs among cattle feeders. Cotton seed cake fed to dairy cows increases the firmness and whiteness of the butter. Rape seed cake is largely used as a manure. Groundnut cake is a valuable food largely employed in Europe. It is particularly rich in proteids. Corn oil cake is rich in proteids and fat and very digestible.

• (2) From Starch Manufacture.

Starch is obtained from potatoes, maize, rice or wheat, in almost all cases by crushing the raw material with water, separating the fibrous, horny, or woody parts by means of sieves and recovering the starch granules from the milky-looking liquid by sedimentation. The fibrous portions generally known as "sludge," are then utilised as cattle food, either in the wet condition, in which state the product is very liable to ferment and putrefy, or after drying.

(3) From Milling of Cereals.

In the preparation of human food-stuffs from grain many by-products are obtained some of which are important as feeding material for farm animals.

The milling of wheat is the most elaborate and yields a large number of different products. Only the bran and shorts should, properly, be used as farm foods. The by-products from the milling of oats in the preparation of oatmeal and groats, or of pearl barely are less important. Rice polish, a finely divided material, is highly nitrogenous and rich in phosphoric acid.

From maize, various by-products are obtained both in the production of "Cornflour" and in the manufacture of starch and glucose.

(4) From Manufacture of Sugar.

In the manufacture of beet sugar the slices of roots after the extraction of the sugar by water, are used as food, sometimes in the fresh wet state, sometimes after drying. They may also be made into silage or sour fodder.

TANS AND DYES.

(a) TAN BARKS.

A large number of forest trees yield tan-barks, some of them of great value, other though containing the necessary tanning properties also contain colouring matter, which is objected to by tanners.

The most important bark now used by tanners, especially in Northern India, is Babul Bark obtained from the Babul tree, *Acacia arabica*. The tree is found in forests, in waste and cultivated lands.

A bark of nearly equal importance to Babul is that obtained from a shrub called *Cassia Auriculata*, yield the Tarwar bark; indeed in Southern India tanners prefer this bark to that of Babul while the Cawnpore tanners state that the tannin from this bark penetrates the hides quicker than that of other barks, though it cannot well be used alone in tanning hides.

Sumari bark obtained from *Cassia Fistula* has not so good a reputation for tanning as that of *cassia auriculata*, though also extensively used for the purpose. The tree is found all over India, Burma, and Ceylon, and commonly known as the Indian laburnum. The bark is used in South India and also at Cawnpore for tanning.

Certain mangroves yield barks rich in tannin, the dye matter is however held by tanners to be excessive. The most important species of this order yielding tans are *Rhizophora Mucronata*.

Other trees which yield tan barks are sain, sal, white mangrove, and others.

Of equal importance to the barks are certain fruits largely used for tanning purposes and preparing tan extracts.

The most important tan fruits are those obtained from the Hirda or Harra tree, *Terminalia chebula*, known on the market as Chebolic myrabolams. Myrabolams are used in India for tanning and are also largely exported to Europe for the same purpose.

The pods of *Acacia arabica* are used in tanning partly on account of the tannin properties they contain, but to a greater extent on account of the good colour they give to leather, their use is generally local.

The other tan fruits of any importance are Emblic myrobalams obtained from the Aoula or Awla tree, *Phyllanthus Emblica* and Beleric myrobalams obtained from *Terminalia belerica*. These are inferior to Chebolic myrobalams, though sometimes mixed with them for tanning.

Divi pods are yielded by *Caesalpinia Coxiaria*.

(b) DYES.

Since the introduction of aniline dyes the value of the most important dyes obtained from forest products has become of local importance only, though a few still maintain some of their former importance.

Red Saunders, the wood of *Pterocarpus santalinus*, a small tree of South India, yields a strong red dye formerly largely exported to Europe but now only used in India. The wood of the Jack-tree, *Artocarpus integrifolia*, as also that of *Artocarpus Lakoocha*, when ground to powder or reduced to saw dust and boiled in water, yields a yellow pigment, used in dyeing cloth.



6. Beetroot for Sugar.

Symplocos Spp. root wood yields red and yellow dyes, those of *Berberis aristata* and *Morinda tinctoria* yield yellow dyes, *Punica granatum* yields a red dye, while other root dyes are obtained from various species.

Many barks yield brown and black dyes such as *Acacia* spp., *Terminalia tomentosa*, *Berberis nepalensis*, *Abeus nitida*, etc., etc.

More important in some ways than root and bark dyes are those obtained from certain flowers.

The well known kamela powder, obtained from the fruit glands of *Mallotus philiphinensis*, a small tree found all over India is extensively collected and yields a red dye. The flower buds of *Ochrocarpus longifolia*, known on the west coast as "Surgi flowers" or "Tambra Nagkesar" yield a red dye used in dyeing silk.

The pulp surrounding the seeds of *bixa orellana* yield the Annatto dye, of commerce, with which silks are dyed yellow and red. Indian saris and cloths are often dyed yellow with the flowers of

the Dhak or palas tree. *Butea frondosa*, the yellow dyes obtained from the flowers of *Cedrela Toona*, *Nycanthes* etc. being used for the same purpose.

FORESTRY.

Unlike agriculture, long periods have to elapse before the forestry harvest can be reaped. It will be obvious, therefore, that extensive tree planting is quite beyond the power of the private individual unassisted. It is a state business, in which regularity of action and large wooded area are first necessities; but unfortunately to this country commercial forestry is but little understood; in fact, may be described as an unknown industry.

Afforestation is essentially a national question; and as to profits, whether these are derived directly from timber sales or indirectly to the matter of hygiene, shelter or improving the agricultural value of the adjoining lands, it will be recognised by all that to make trees grow where there are waste wood, is deserving of equal credit with the making of two blades of grass grow where one grew before.

From a purely commercial point of view, which must be the case in all large afforesting schemes the best trees to plant are such as will produce the largest amount of the most valuable timber in the shortest space of time.

Timber, whether in a converted or unconverted state, is essential in practically every form of commercial enterprise, including railway construction and maintenance, ship building and repairing, street pavings, building construction, and for mining purposes generally; while the

wheel and cartwright; maker of agricultural and other implements; cooper, furniture and packing case maker, are almost entirely dependent on timber for carrying on their profession. In every country it is noticeable that the more civilised a community becomes, the greater are its requirements for timber, both in the round and converted state.

MAJOR FOREST PRODUCTS.

Under the head of major products come all the timber and fuel produced by the forests. A great variety of different sorts of timber is available, far larger than is generally realized by the public. For instance, the number of tree species is about 2500, while the number of woody climbers and shrubs is not far short of that figure. Out of the great number of tree species only a certain percentage yield timber of value, some being suitable for one purpose, some for another; other species yield valuable firewood, and again some yield byproducts, such as cutch, agar-oil, oleo-resins, tan-fruits, and dye flowers, fibres, or support the lac insect and silk worm.

The most valuable of the major products is without doubt Teak. To grade the other timbers according to their value is hardly possible; it is sufficient to state that sal, sandal, sissoo, Blackwood, Deodar, sundri, both Andaman and Burma padauk. In or Eng, iron wood, Red sanders, Khair and Babul stand in the first class and that it would be easy to name fifteen or twenty more species whose claims as useful climbers might be put forward with justice.



7. Source of Tanning Barks.

MINOR FOREST PRODUCTS.

Under this heading come all minor forest products. These for convenience may be divided into two sections:—

(i) those exported from the forest and used for manufacturing and other purposes;

(ii) those utilized in the forest or merely removed by right or privilege holders to their homes for their own use. Naturally some of the products come under both heads.

Under the former class may be mentioned cutch, myrabolans, fruits, certain gums, mohwa flowers and seeds, colophony and turpentine, the product of pine-resin, babul bark for tanning, rubber, and lac. As examples of products coming into the second class may be mentioned jungle roots, fibres used in making coarse ropes and twines edible seeds, flowers and leaves used for dyeing, drugs extracted from various parts of trees and shrubs of which a few also come under the first class, leaves for plates, grass for thatching, litter, and a variety of similar products often of con-

siderable local value to the inhabitants living in or near the forest.

In Burma, the forest products that are used for food are innumerable comprising fruit, bark, young leaves, flowers and roots.

Useful trees are, spondias, mango artocarpus, mimusops, zizyphus, baccaurea, garcinia etc. In times of famine still more kinds of forest vegetables are used for Burmese curries. Young bamboo shoots are collected after the rains and are sold in every bazar. Kaking-U found in the tidal forest are a favourite delicacy. Bamboo seed is eaten when the bamboo flowers, and as it usually does so over large areas, the seed helps to tide over the scarcity caused by the damage done by the rats, which usually appear with a bamboo flowering. Young leaves are a favourite ingredient in curries and many kinds are collected by villagers who live near forests.

GUMS AND RESINS.

Gums, resins and oleo-resins form an important section of the minor forest products. The gums yielded by many species are not only plentiful but are also largely used for such purposes as mucilage, calico printing, confectionery, and in medicine. A few of these gums are exported to Europe, as for instance gumkino, though by far the great majority are used in India only.

Resins may be classed into two sections (i) Pine resins and (ii) Resins from broad leaved species. The former are chiefly obtained from the chir, pinus, longifolia the kail, pinus excelsa and the east Himalaya and Burma pine, Pinus Khasya, from which on distillation the

reses yields, resin or colophony and turpentine. Resins from broad leaved species are sometimes called dammars though the true dammar comes from a conifer not found in India. They are obtained from such species as *Hopea odorata*, *shorea robusta* (Sal), *Valeria indica* (The Indian copal tree) etc. and are used for varnish, caulking boats and ships, for burning as incense, and in medicine.

The oleo-resins consist of resin and volatile oils. Some of them such as Thisti and Gurjan Oil, are of considerable commercial importance and largely utilized as varnish and for caulking the seams of boats.

BAMBOOS.

The number of different species of bamboos found in India and Burma is very large, numbering in all about 100, of which some are restricted in their distribution, while others cover vast areas. Their commercial and economic value varies not only with the species but also with the locality.

Bamboos of different kinds are used for a variety of purposes, such as for super structure, roofing, walling, flooring, matting, spearshafts, masts, spars, buggy shafts, bamboo furniture, tent-poles, walking-sticks, water pipes, transport poles, basket making, musical instruments, such as flutes and though not at present used for paper pulp in India, it is very probable that they may be used for this purpose in the near future.

CANES.

A great variety of canes occur in the forests of India & Burma, esp. in Bengal, Eastern Bengal, Assam, Burma, the

Andamans and on the west coast. They are either used locally or exported, for such purposes as for basket making, furniture, cordage, walking sticks, fishing-rods, as a substitute for punkha ropes etc.

GRASSES.

The grasses, so extensively diffused, and in different forms as pasturage for cattle and corn for man, so essential for the continued existence of the animal kingdom, are seldom thought of as materials for cordage. Yet they were probably the first substances which were converted into rope; for the simple twisting between the ends of the flexible leaves and pliant stems of many of the grasses will form a rope as is daily practised with bands of hay or those of straw. Others are employed for thatching, and some for plaiting screen and mat making. All purposes which indicate the presence of fibre of sufficient tenacity to bear at least a certain degree of strain and pressure. But in these plants as well as the sedges and rushes the fibre is not always separated from the rest of the vegetable matter, but the whole leaf or stem is dried, and used in its entire state. As the fibre, however, possesses the requisite degree of tenacity it can be separated in the form of pulp and used for paper making.

The grasses abound in India; in the plains are numerous species of genera little known in Europe; with the cultivation of rice, maize, jowar, and many millets in the rainy season; and in the cold weather, of wheat, barley, oats, and millet.

FRUIT CULTURE.

The rapid development of commercial fruit culture has been one of the remarkable features of the agricultural progress of the work in last century. From the position of an insignificant industry at the beginning of the century it has risen to commanding importance in many countries and in some has become the dominant feature of agriculture.

The successful fruit grower in the first place, must be a good general farmer; he must understand all about teams; the uses of tools, ploughs, and harrows, and the methods of preparing land, seeding, and cultivating. He should have some knowledge of chemistry so as to know how to buy and mix his fertilizers and study the chemical needs of his crops. Knowledge of plant

pathology and physiology is essential, and he must keep fully abreast with the latest methods of defending his plants against disease.

He should know fruits and fruit trees thoroughly, at least all the species which he grows; he must be familiar with the merit and defect of old varieties and be quick to discover the value of new ones. Some large fruit growers have found it to their advantage to provide factories for reducing their produce to jam, or preserving fruits whole in bottles upon the premises. Properly worked, this should secure the profits that go to other dealers, and enable the grower to utilise his fruits in seasons of glut when the market rates are unduly low. It is obvious that the two departments are very distinct, and require a different kind of experience and knowledge.



8. Pineapple Orchard.

MARKET GARDENING.

Market gardening in its widest sense, comprising every department of productive commercial horticulture must always rank in populous countries amongst the most important industries connected with land cultivation. Though mainly concerned in providing a material portion of the food of the people, it also contributes largely to the health, to the pleasure, and to the artistic tastes of all classes. The concentration of wood beds in the cities has increased the necessity for abundant fresh fruits and vegetables and the demand has advanced rapidly while the self-supplying members of the community have been reduced in numbers by the depopulation of rural districts and the totally inadequate provision of garden ground to urban residences. With increased facilities for the economical distribution of produce, there can be no reasonable doubt that for many years market gardening will extend over greater areas of land, the domain of the farmer will be more and more invaded and the wider adoption of intensive methods of cultivation will gradually bring back to usefulness thousands of acres that have almost become derelict under out-of-date and exhausted systems.

Near populous cities vegetables are always largely grown, as the demand is constant for fresh produce, and where bulky or heavy crops of that kind can be conveyed by road, it is advantageous to the grower. Another point in their favour is that under the best systems of cultivation several crops can be raised from the same land in one season. Very large returns are also obtained from well-

grown vegetables of the more important kinds and it is not therefore surprising if these crops rank high amongst those to which a grower turns his attention.

Hardy fruits are indispensable wherever the soil and situation are suitable, and the best varieties well grown constitute a most important part of a market man's assets. In favourable seasons the returns will always be substantial for the space occupied and occasionally special crops of choice fruits will yield a profit unsurpassed by any other form of outdoor cultivation.

Plants grown out of doors to supply flowers for cutting constitute an important department, which can be well included with the others named in a general business. Where fruit trees are grown as standards, not too closely planted, the ground beneath can be cropped with many flowering plants.

Where a combination of the nursery business with market gardening is carried on as some growers do very successfully, hardy trees and shrubs are included in the stock, besides a general collection of fruit trees and bushes.

BUSINESS PROFITS.

Every business that is conducted for gain has two sides, the practical and the economic. On the former of these the man of business endeavours to produce the best article he can, the one most suited to the customer's requirements. On the second he tries to make his incomings exceed his expenses by discovering means of cheapening his processes, or of increasing his values. Agriculture forms no exception to this rule. A farmer must, in order to lessen his expenses, produce as cheaply as



9. Drying Cardamoms.

possible the best article he can contrive to put on the market. This is the first element of profit making. The farmer, like any other business man has got to decide when it is most profitable, to expend money, and when he will best be served by reducing his outlay. It is the more difficult in his case inasmuch as his turnover is slow (in respect of much of his produce only once a year) and the wisdom of his expenditure is often dependent on the weather or other circumstances over which he has no control. The competition with fruit and vegetables for the early market at a season when prices rule high, is extremely keen, and, as is well known, extraordinary prices are often given for special plants or seeds having a tendency to ripen early or resist diseases.

SUBSIDIARY INDUSTRIES.

As one of the many directions in which improvement in the Indian Agricultural system is possible, the introduction of subsidiary industries, is by no means the least important. Among the industries which may easily be started as subsidiary industries the following claim particular attention, namely:—Sericulture, apiculture, floriculture, cattle and poultry farming and hand loom weaving. Each of the above can be carried on as a principal industry, if conducted on a large scale, but as a subsidiary one for small farmers they are specially adapted. They do not require any exceptional skill, large capital, or sole devotion to the same industry throughout the year, and will furnish occupation to a large number of male,

as well as female agriculturists, without in any way interfering with their ordinary occupations.

The thing which strikes most observers is that the Indian cultivator trusts too much to a single crop, and that he has few subsidiary sources of industry or income. The man who puts all his eggs in one basket runs an obvious risk, but, apart from that such a system must tend to concentrate all the farm work at certain seasons and to leave the farmer with little to do at other times of the year. This is what actually happens; and as a result, people are always searching for some subsidiary industry with which the farmer can fill up his spare time. If technical skill of a kind which is now conspicuously absent can be developed, some use might be found for the cultivator's spare time in working up the raw materials of wood, bamboos or stone into finished products; but at present there is little movement in this direction and such work is mainly carried on by definite classes of specialised workers. Attempts have been made to get cultivators to take up unskilled work such as cotton spinning by hand, but in view of the efficiency of spinning mills such operations can be justified economically only on the assumption that the cultivator now wastes so much of his time that any work which he does, however badly paid, will be better than nothing.

LIVE STOCK BREEDING.

The subsidiary industry *par excellence* of the cultivator should be the breeding and rearing of live stock, which provides an occupation and an income at all

seasons, and returns to the soil the manure which is necessary to maintain it in high fertility. There is a good demand for milk and milk products as well as for poultry, eggs and mutton; and even the smallest cultivators might keep cows, buffalos, goats or poultry. But it is here that their defective organisation tells against them. Not only are their holdings scattered but their villages are congested and the people live crowded into small village sites which give them no facilities for keeping live stock. Most cultivators do try to keep some farm animals, but the difficulties caused by lack of accommodation in the village are considerable, and the fact that the animals are crowded into their houses in the village, while the fodder stack is in their fields at a distance, and the manure heap outside the village, prevents the orderly development of the industry so far as most cultivators are concerned. This leads to the result that where economic cattle are bred on satisfactory lines, the work is usually done by professional breeders who take special steps to organise the business on workable lines, and not by the ordinary cultivator as a subsidiary occupation to the tillage of the fields. It would be of the greatest advantage to the cultivator if he were in a position to undertake the breeding and feeding of live stock on systematic lines as part of his ordinary business; but this can hardly be done generally until the existing circumstances of scattered holdings and congested villages are modified. Meanwhile the cultivators are unable to take advantage of what should be their principal subsidiary industry and suffer

every year from long periods of enforced inactivity when field work comes to an end.

COW.

The first live stock which a tenant should acquire would be a cow. If he had some pasture attached to his holding the keeping of the cow would be rendered easier. The food of the cow would be hay, chaff, ensilage, and roots with grass, clover, lucerne, or other green food.

FIG.

The next most important stock for a small farmer are pigs, which are of a more profitable character. Three breeding sows might be kept, and the offal from the wheat with waste garden produce

would be more than sufficient to maintain them for the entire year. Each of these sows would give a litter twice a year, the number of pigs in each varying, but most frequently being from nine to twelve.

GOAT KEEPING.

The keeping of goats is one branch of farming which should receive more attention from those cultivating a small area than it now does, and on any extended system of small holding it should be more largely carried on. The goat will live on a larger variety of diet even than the pig, which if stall-fed specially for milk production, will be one of the most useful animals that any small holder can keep.



10. Preparing Cinnamon.

BEE KEEPING.

One matter upon which there is a large amount of misapprehension is bee-keeping. This branch of country work requires skill and experience. Winter feeding, summer feeding, wintering, driving, swarming, arrangements for breeding, queen raising, hive ventilation and various other subjects are all matters of which a bee-keeper, to be successful, must have some knowledge. In addition he must be acquainted with the habits, instincts and diseases of bees.

POULTRY.

Great profits may be derived from poultry keeping than in any other department of farming.

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THE FIBRE INDUSTRY.

IT is an undeniable fact that our country abounds in various plants yielding different kinds of fibres which are highly strong and some so fine and bright as to take the place of silk. Some of these fibre-yielding plants or trees are of wild growth in forests while others are to be grown for the purpose if they should be had in quantities to enable us to have a commercial success by finding adequate supplies. Even some of the popular fibres which are being used for rough work such as stuffing or ropemaking can be refined and given a silken appearance by treating them chemically under different processes.

It is my object to deal with all the details of fibre manufacture exhaustively in order to enable small capitalists to take up some items on hand and work them up to the advantage of themselves and our country's economic prosperity.

ALOES (AGAVE.)

The most popular and common fibre-yielding plant in our country is aloes or agave. This is a native of America and was brought into our midst to find a use for making ropes for ordinary purposes of drawing water, tying up cattle and the like. The plant is ordinarily grown for fencing and it will grow in any kind of soil and does not require any watering for its growth. The seedlings are available by the side of the roots of the big plants, and if one is replanted, there will be several shooting forth by its side. There have been several plantations grown especially with these plants for

the sake of its fibre. The fibre is extracted out of its spiky leaves by fermentation process. There is a great demand for this fibre in Europe and we can expect good prices for the same if we can export it on a large scale to England, France or Germany.

FERMENTATION PROCESS.

The leaves are selected from the plant, and the thorns by the side of the leaves and their end, are got rid of by shaving and about twenty or thirty prepared leaves are bundled up and thrown into water. The bundles are made up with some stones in the middle to make them heavy so that they can sink down to the bottom. Fermentation will set in and it will take more than a month for its completion. Then it is taken out and beaten on a stone slab with the help of water, so that all the pulp can be washed off; and the fibre then takes the appearance of bleached coarse silk. Tender leaves give a softer and whiter fibre than the matured ones.

PROPERTIES AND STRENGTH.

Aloe fibres are not impervious to water and consequently when they are used for purposes in which frequent soaking in water is unavoidable the fibre cannot stand the strain and will be found unsuitable for the purpose. If care is taken to use the materials made out of these fibres for purposes other than where frequent soaking in water is unavoidable. Such articles will maintain their strength admirably. Beyond this there is no other drawback with this fibre. The greatest advantage with this fibre is that it is one of the longest of

fibres available and of the purest white colour.

TREATMENT.

By treating this fibre with some chemicals it can be made to attain a lustre, flexibility and shining similar to silk, whereby it can replace silk and textiles can be manufactured out of it. Commercial Hydrochloric acid (weak) mixed with an equal quantity of sweet oil (gingelly oil) will act upon the fibre. The fibre can attain the properties of silk by soaking it in a bath of the above mixture for fifteen minutes and then removing it into another bath containing only sweet oil and allowing it to remain there for fifteen minutes, and then introducing it into a third bath containing soap solution in which the proportion of soap is one pound to a gallon of water, where it is allowed to remain for half an hour and then rinsing it in clean water. After undergoing these processes clothes can be woven out of it which will have all the requirements of silk. Care should be taken in selecting the tender leaves, of aloe for this purpose but to give a fibre tolerably strong they should not be too tender. In selecting the leaves it should be noted that whitish tenderness of leaves is not fitted for the purpose but they should have attained green colour and they should have separated themselves from the conical stem.

DYEING THE FIBRE.

Since the fibre is of vegetable origin it can be dyed in the same manner as cotton yarn. Bleaching is not required to be done since the fermentation process makes it thoroughly clean and white.

COCONUT FIBRE.

A very strong fibre is obtained out of the covering of coconut shells. Rough fibre is obtained by simply peeling out the fibre out of dried husks and this fibre is generally used for stuffing the cushions of chairs and sofas. A coarse rope is also made out of it which can be used for tying up bamboos and other coarse works.

FERMENTATION PROCESS

The husks of coconuts while yet fresh are dealt with similarly as those of aloe leaves and are left to ferment for more than three months. Then they are taken out and beaten with a hammer when the pulpy matter is separated and the fibre is left behind. This fibre will be of reddish grey colour and cannot be bleached ordinarily.

BLEACHING.

Bleaching of coconut fibre can be effected by the process of Dhobies' bleaching. Soak a quantity of fibre in a solution of fullers earth and *chunam* and have it wrung. Then cover this fibre over a steam bath and generate steam by applying heat at the bottom of the pot containing water. If the fibre is left in steam for three hours the colouring matter will be acted upon and when the fibre is rinsed in clean water it will become white. This can be used for preparing high grade articles such as hats, &c.

USES OF COCONUT FIBRE.

Coconut fibre is one of extraordinary strength and is capable of standing any strain and atmospheric changes. It will admirably withstand the action of moisture and even sea water. Hence it

is best suited for all purposes on ships and boats. Mattings are prepared out of selected fibres and made to last a lifetime. Mattresses prepared by stuffing soft fibres are very useful and they are very conducive to health. Coconut fibre is used for making varieties of brushes. Besides these high grade uses it is made into ropes for drawing water, for tying up cattle, and hundreds of other purposes in which it is found indispensable.

HEMP.

Next in use, but first in importance comes Hemp, out of which gunny bags and thatoos for packing purposes are made. This is a plant grown almost all over India chiefly for its fibre. There is a variety of this grown in dry lands on a small scale. This will answer the needs of the *ryot* for his yearly requirements, but it is not grown on a commercial scale. The hemp out of which gunnies are made are grown extensively by the jute traders and every year (worth lacs of rupees) produce is converted into money. This is a commodity of universal requirements. It is not my desire to dwell upon this subject in detail since it has been already an established mill industry.

PLANTAIN FIBRE.

The manufacture of plantain fibre can be worked out extensively. It has got all the qualities of a good fibre in appearance, length and softness, but the greatest drawback in it is that when once it is put in water and dried, it loses all its strength and breaks when it is folded and unfolded. All attempts to make it retain its flexibility have failed, and so those who undertook its manu-

facture have given up as being hopeless. The popular belief that the artificial silk which has found its way into the market, of late, is treated plantain fibre, has no foundation. It is not my desire to deal with this fibre since its exploitation is likely to meet with a disappointment.

BOWSTRING HEMP.

This is a variety belonging to the family of aloes—but it is called hemp by mistake. However that might be, this plant also yields a fibre similar to the hemp, but of a clean white colour and stronger than any kind of hemp. This plant is seen grown in orchards and flower pots as a decorative plant, and it is seen growing wild in jungles also. The spiky leaves of this plant are similar to aloes but without any thorns and more pulpy. Fibre can be extracted out of this by the fermentation process, and its strength is admirable and hence it is called "Bowstring Hemp."

ARECA NUT.

This is a plant grown in gardens for the sake of its nuts which are being used as Supari in every household. The use of its fibre out of the rind of nuts is little known. A fibre as soft as the finest wool can be extracted out of it by the fermentation process. This rind, after taking out the nuts, is now washed away or used as fuel. When fibre is extracted out of it, it will be found to answer the purpose of stuffing for mattresses admirably even better than the finest cotton. During the process of fermentation it will be found more advantageous to put the bulk of rinds in a marshy place into a pit and then cover it up. The fermentation shall be complete in about three months, when it has to be

taken out, squeezed and rinsed in clean water. There will be left the outside fibre entangled with the inside rough kernel fibre. The two can be separated by beating and picking. This fibre can be used for making yarn and finest cloth can be produced out of it since the tissues of the fibre are very fine and soft. This can be made commercially successful since thousands of tons of areca nuts are grown in the fertile tracts of our country.

MADAR.

This is a plant having wild growth in the waste lands of our villages and in some parts of jungles. Both the fruit and the stems yield an excellent fibre similar to and even softer than silk. The fruits which are in the shape of a crescent contain small seeds and covering these seeds there is the fibre. Each fruit will yield a few grains weight of fibre. This fibre is so very soft as could not be even felt by touch and a pillow made out of it will give the experience of its softness. The fibre is so soft and slimy that one tissue cannot be twisted with the other and hence it is useful only for stuffing. The fibre obtained by fermenting the stems by placing them into water for more than a month will be very useful in making into cloth, but it is doubtful whether it could be made a commercial success, since the plants cannot be found in abundance.

The contributor of this article will be highly pleased to answer any questions pertaining to any practical difficulties that can be experienced by those who will undertake any of the above industries.

—By Mr. K. R. Chakravarthi.

SPICE-PRODUCING PLANTS.

IT is somewhat difficult to separate spices from other aromatic flavouring agents, such as anise seed, and bay leaves. As a rule, however, spices have a sharp pungent taste modified by other flavours characteristic of each sort. Most of them are used in a ground state, owing to the necessity of using them in small quantities because of the intensity of the taste-sensations which they impart. Many aromatic products are much milder and can be used in a whole state, without the development of too powerful sensations. These more powerful flavouring agents, by common usage known as spices, are here briefly described.

The common spices are derived from almost as many botanical families as there are spices, and nearly all products here concerned are of tropical origin.

The Banana family (Scitamineae) includes a series of perennial, herbaceous, rather succulent plants, having strong flavouring properties distributed more or less widely throughout the plant, as ginger, turmeric, (curcuma) and cardamoms. The Nutmeg family (Myristicaceae) furnishes nutmegs and mace, products derived from the fruit of the nutmeg tree. The Myrtle family (Myrtaceae) supplies two of our most important spices--cloves and allspice or pimento. The Laurel family (Lauraceae) yields cinnamon bark and cassia buds, products of a number of species of the genus *cinnamomum*. Black and white pepper are derived from the same plant, *Piper nigrum*, a member of the Pepper family (Piperaceae). Red pepper is not a member of the Pepper family, belonging rather to the Potato family.

The parts of the plants used in making spices seem to be determined by three points: (1) The part must contain the pungent or aromatic principle in

large quantity. (2) It must be accompanied by other tastes giving a pleasant combination, or it must at least lack unpleasant constituents. (3) The texture of the product must not be too hard, tough or woody for proper grinding and use. Consequently, in general, spices consist of the tender parts of the plants, such as the inner bark, seeds capable of ready grinding, buds, rhizomes and fruits. Among the spices above mentioned, ginger and its near relative, turmeric, are made from the younger, tender parts of the rhizome. Cinnamon consists of the carefully cleaned and dried inner bark of the smaller branches of the unopened flower buds picked and carefully dried. Cassia buds represent immature fruits enclosed in the calyx of the flower. Allspice consists of the

full-sized but immature fruit packed from the pimento tree while still rich in the pungent principles. These in part disappear on ripening.

Black pepper consists of the small round fruits of the pepper vine, plucked when the colour has changed from green to red. These hardly ripe berries are more pungent than when fully ripe. White pepper is prepared from this fruit after it has ripened. The berries are soaked in water and the dark pulpy covering brushed off. The remaining part is less aromatic and pungent than the black pepper. Red pepper is obtained by grinding the dry ripe fruit.

Mustard consists of the ground mature seeds, usually of the white sort. Nutmeg are the hard inner kernel of the fruit of the nutmeg tree. The entire fruit, having the size of a small apple, consists of three parts: an outer, fleshy, pulpy covering beneath which is found the mace, occurring as a partial covering over the kernel or nutmeg proper. All parts are aromatic but the mace and kernel are especially so.

Small Trades & Recipes.

Flower Fertiliser.

	By parts
Ammonium nitrate	40
Ammonium phosphate	20
Potassium nitrate	25
Ammonium chloride	5
Calcium sulphate	6
Ferrous sulphate	4
Total	100

Dissolve 1 part in 1000 parts water, and water the flowers with it 2 or 3 times weekly. Dissolve 4 parts in 1000 parts water, and water with this quantity 10 or 12 pots of medium size.

To Exterminate Insect.

By scattering chloride of lime on a plank in a stable, biting flies are driven away. Sprinkling beds of vegetables with a weak solution of this salt effectually preserves them from caterpillars, slugs, etc. It has the same effect when sprinkled on fruit trees or shrubbery. Mixed in a paste with fatty matter, and applied in a narrow band around the trees, it prevents insects from creeping up.

Hens and wasps and spiders are all devourers of plant enemies. A common duck will go up and down rows of tomato and potato vines, and pick off the large worms usually found on such vines as fast as it can see them. All fallen fruits are to be picked up, boiled and then given over to cattle to be devoured. By doing this it will pay ten times over and the result will be that next year there will be no insects.

Manure from Saw Dust & Chips.

These are excellent articles for promoting the growth of the vines,

shrubs and small plants. They must be thrown into a pile, after removing the coarser portions of the mass, and thoroughly saturated once or twice with a mixture of urine and soap suds. This will induce incipient fermentation, and so far break down the texture of the mass as to prepare it to act with energy when applied to any soil or crop.

Compost for Indoor Plant.

	By parts.
Ammonium sulphate	30
Sodium chloride	30
Potassium nitrate	15
Magnesium sulphate	15
Magnesium phosphate	4
Sodium phosphate	6

100 parts.

One part to be dissolved in 1000 parts water and the flowers watered upto 3 times daily. Dissolve 4 parts in 1000 parts water, and water with this solution daily.

Silvering Mirror.

(a)	Nitrate of silver	175 gr.
	Distilled water	10 oz.
(b)	Nitrate of Ammonia	262 gr.
	Distilled water	10 oz.
(c)	Pure caustic potash	1 oz.
	Distilled water	10 oz.
(d)	Pure sugarcandy	$\frac{1}{2}$ oz.
	Distilled water	5 oz.

Dissolve, and add 50 gr. of tartaric acid; boil in a flask for ten minutes and when cool add alcohol, 1 oz; and distilled water in sufficient quantity to make up to 10 oz. For use take equal parts of (a) and (b) and mix together; also equal parts of (c) and (d) and mix in another measure. Then mix both these mixtures together in the silvering vessel and suspend the mirror face downwards in the solution.

INDIA'S INDUSTRIAL PROGRESS.

India's Drug Resources.

It is true that India was practically a self-dependent country as far as drugs were concerned before the introduction of western medicines, write a contemporary. With the development of easy communication between India and Europe the importation of drugs and medicines, not merely manufactured but also grown outside India, increased to a considerable extent. Although indigenous sources of supply such as, for example, belladonna, henbane, podophyllum, etc., lay at hand and were rotting in the jungle yet drugs of similar kind were abundantly imported from foreign countries. When the outbreak of war cut off supplies from abroad, indigenous sources were eagerly investigated, and not only were existing medicinal plants harvested but also successful attempts were made to cultivate many species which had not been previously grown. The industry under this powerful stimulus made a great progress and enjoyed much prosperity but it has suffered severely during the depression which followed the war. Naturally enough, a great reaction imposed a heavy strain upon a branch of trade so recently and rapidly developed. Besides this, a tendency to sophistication was a grave fault which is partly accountable for this setback. Not unnaturally the sudden rise of the industry attracted the attention of many unscrupulous persons who found little difficulty in passing off poor and adulterated products at substantial profits. Probably the connection of such traders with the industry would be short, but nonetheless Indian producers of materia medica will not secure the markets they desire unless a high level of quality can be reached and guaranteed.

Sericulture in Bengal.

We learn from a Government report that the Bengal Silk Committee was reconstituted in the year 1923 on a popular basis, the silk-rearing and trade interests being represented on it. The main function of the government nurseries continues to be the rearing of disease-free stock. Better manuring has resulted in an increased yield of mulberry leaf with the consequent reduction in the quantity of leaf purchased from outside sources. The policy of the propagation of disease-free seed through the agency of selected rearers, under departmental supervision has been attended with encouraging results. Ten new seed farms were started during the year, bringing the total number to 52 in the districts of Malda, Birbhum, Rajshahi and Murshidabad. The reellers' and rearers' co-operative societies in the several districts are reported to be doing good work. The report makes mention of the progress made in the introduction of the silk-rearing industry amongst the *bhadralog* classes in the neighbourhood of Behala in the 24-Perganas. It is hoped that the interesting demonstration work, which is being carried on in the 24-Perganas district, will result in popularising sericulture as a profitable occupation to educated young men. At Mymensingh the Central Co-operative Bank has taken up the work of rearing with a view to encouraging the development of sericulture in the district. Encouraging results have been obtained from the experimental plantation at the Dacca Farm. In the Bankura district good progress has been made towards the revival of the silk industry and steps have been taken for the establishment of a nursery at the Vishnupur subdivision of the district.

SCIENTIFIC AND TECHNICAL TOPICS.

Cure for Broken Bones.

Broken bones can be cured through the use of a new glandular extract, that has already proved its usefulness in curing tetanus. This is the information from Japan where experiments have been in progress with the hormone of the parathyroids that was isolated last year. The hormone when injected or given by mouth induces an increased concentration of calcium and phosphorus in the blood serum. It was applied successfully to the cure of tetany. A much wider utility for it is foreshadowed by the subsequent work of a Japanese surgeon. As bone is largely composed of calcium phosphate, a hormone which raises the concentration of this substance in the blood, might be expected to assist in bone formation. The slowness of healing process in fracture seems to be largely due to the very small amount of calcium and phosphorus in the blood. The publication of the results in the case of human beings is awaited with great interest, for there is reason to believe that the administration of the parathyroid extract would not only hasten the healing of the fractures in the young, but might render it possible in old age.

New Forcing Methods for Plants.

Some novel recent methods of forcing plants are noted by a German botanist. Long known ways of quickening the

spring awakening are the ether process of Johannsen and the warm bath method of Molisch, and the latter is so simple and certain that a bath at a temperature of 95 deg. F will start the development of deeply sleeping buds within twelve hours. The new plan of squeezing or pinching the buds was first described two or three years ago. The effect is quite astonishing, and in a warm room the buds such as those of elder and forsythia immediately begin to develop, which unpinched buds fail to do. Even more amazing is the process of Richter, consisting in dipping the buds into concentrated sulphuric acid, then washing thoroughly. Twigs sprout immediately and development proceeds several weeks in advance of the control specimens. The Rontgen process, in which a strong dose of X rays is applied, also gives surprising premature growth. A new forcing bath is a solution of 30 grams of sugar in half a litre of water, with the addition of 20 grams of fresh yeast, and in this bath such twigs as those of elder are allowed to remain twenty-four hours. The forcing effect is remarkable, elder being made to sprout even in the deep sleep of its early dormant period.

Smallest Camera.

"What is doubtless" the tiniest camera in the world is part of a medical apparatus invented by a German Doctor. Hitherto

all examinations of the human stomach on living persons had been made by X-rays, but direct photographs were more satisfactory.

A long tube is now passed through the mouth into the stomach to the end of which is fitted a tiny electric light and periscope mirror. The camera is at the other end of the tube, and the lens is just large enough to admit a reflected picture of the inside of the stomach.

Seven different pictures of the walls of the stomach can be made in quick succession, and the negatives are enlarged.

This series covers the whole interior so that an absolutely reliable diagnosis of the patient's diseases can now be made.

Agricultural Train in South Africa.

A useful innovation is made in South Africa by the running of an agricultural demonstration train. The train may be described as an itinerant agricultural school in miniature, staffed by lecturers drawn from the agricultural institutions and equipped with all the apparatus necessary to demonstrate instructions in the principal branches of agriculture and farming such as cattle, sheep, crops, cotton and tobacco, domestic science and horticulture. Even one van is devoted to entomology, where everything known about crop pests and methods to prevent their ravages is clearly illustrated.

Poultry farming is also dealt with and it is intended to add coaches specially fitted to demonstrate dairying, engineering, veterinary science, botany and chemistry. It is understood that the train will tour the agricultural districts and visit all the principal shows. If a similar method be introduced in India then cultivators may get the benefit of some practical knowledge in agriculture in a popular way.

Industrial Utilisation of Bananas.

In a recent issue of a technical journal reference is made to the industrial possibilities of the banana. It is possible to extract from the banana the following products:—Banana flour, banana malt, dried bananas, banana essence, liquor, wine, cacao, chocolate, and lastly, jam.

In the green state this fruit contains principally 80 per cent. of starch and 2 to 4 per cent. of sugar and when it is ripe the proportions are reversed: the fruit is composed of 70 per cent. of sugar (40 per cent. saccharose and 30 per cent. inverted sugar) and 2 per cent. of starch only. Banana flour is prepared with the green fruit. The dry bananas form masses which are shipped to Europe for the manufacture of banana flour and banana cacao. Banana flour is constituted almost entirely of starch, and is used practically only for food; on the addition of 25 per cent. of cornflour it can very well be used for the making of biscuits. By means of a suitable operation this flour may become rich in sugar and be then transformed into malt, which is used for the preparation of banana cacao and chocolate.

It is possible, by special processes, to extract from ripe bananas essential ethers which may be advantageously employed in the manufacture of liquors, jam, and other products. Banana alcohol or spirit may be obtained as a secondary product of the manufacture of the essences. Banana wine may also be manufactured, and satisfactory results have been obtained by employing as ferment for this preparation the residuum of liquor wine; the fermentation may be conducted in such a manner as to produce either sweet or dry wines. Banana peels represent an important portion (40 per cent.) of the total weight of the fruit, and as they have an appreciable nourishing value they may be advantageously used for feeding animals.

FORMULAS, PROGRESS & ANSWERS.

Carbide of Calcium.

2077. P. C. B. R., Shahpur.—Enquires how calcium carbide is manufactured.

When a mixture of lime and coke or other form of carbon is subjected to the intense heat of the electric furnace chemical action takes place between the two substances. The lime is separated into its two complement parts, calcium and oxygen which combine with the carbon to form carbide of calcium and carbonic acid respectively. The latter passes off as a gas whilst the carbide remains in a molten or half molten condition, and is either run off or allowed to form itself into an ingot in the furnace. A very large amount of electrical power is required for the manufacture of carbide on a commercial scale and for this reason factories for its manufacture are usually situated at places where water power is available.

The importance of carbide of calcium as a commercial product lies in the ease with which it can be made to generate acetylene, which of all gases has the highest illuminating power. In order to produce this gas it is only necessary to bring the carbide into contact with water in a suitable generator, whereupon the calcium combines with the oxygen of the water to form lime whilst the carbon combines with the

hydrogen, to form the gaseous product acetylene.

Purification of Water by Permanganate.

2371. S. V. R. N., Ahwaz.—Asks how to purify water with potassium permanganate.

Valuable at once as a coagulant and a germ-destroyer is permanganate of potash or of soda, which is the active constituent of various disinfectants. The molecules of the permanganate yield up five atoms of oxygen which are ready to act upon organic matters and to destroy bacteria. At the same time insoluble oxide of manganese is produced, and this body acts as a precipitant. The sterilization of water by permanganate has often been effected on a small scale. The cost is, however, too high for large installations.

If water of an extreme degree of purity be required by the process of distillation, the operation should be carried out as follows:—

A strongly acid solution of potassium permanganate must be added to the water and the distillate must be redistilled with an admixture of aluminium sulphate. As a result of this treatment the distillate will be free from all trace of ammonia, of chloride and of organic matter.

- **Pulp from Waste Paper.**

2582. B. H., Maldah.—Asks how pulp can be made from waste paper.

In treating waste paper for conversion into pulp for paper-making, it is doubtless advisable to separate, as far as can be done economically, papers which have been written upon with common ink, as old letters, documents, etc., from printed papers, since the latter require a more severe treatment than the former. While simple boiling in water containing a little soda ash will discharge ordinary writing ink, printer's ink can only be extracted by using rather strong solutions of soda ash or caustic soda.

- In the case of old printed papers of the higher grade such as book and magazine papers, in which there is no ground wood, little difficulty is experienced in preparing them for use a second time. The removal of the printer's ink can be effected by cooking in digestors with a caustic soda solution followed by disintegration and washing of the pulp. The alkali removes the rosin sizing and saponifies the oily constituent of the ink thus rendering them soluble and loosing the pigments so that they may be detached from the surface of the fibres and washed out.

In this process, as applied to old magazines, the staples are removed by mechanical means and the magazines fed into rotary digestors. The removal of the staples allows them to come to pieces sufficiently so that the alkali can penetrate enough to reach all parts of the paper and opening up by thrashers is therefore not necessary. About 3 to 4 per cent of caustic soda, on the weight

of the papers, is then added together with enough water to insure thorough saturation of the charge and it is cooked at 40 to 50 lbs. steam pressure for a number of hours, sometimes as long as 13 hours. After blowing down pressure the rotary is dumped and the stock allowed to drain. after which it is transferred to washers and washed and bleached in practically the same manner as rag stock. The time required for washing varies greatly with the size and condition of the washing engine. The bleach required amounts to 3 to 4 per cent of the papers used and the colour obtained is usually a greyish white because of the impossibility of removing all traces of the carbon from the printer's ink.

Reproduction of Sound in a Gramophone.

2575. H. D. S., Jullundur.—Writes: Can you explain the theory of reproduction of sound in a gramophone.

The talking machine so far as it has yet been evolved, requires various appliances and accessories to act in conjunction with it before we can get a perfect reproduction of the recorded sound. In disc machines there must, first of all, be the motor to rotate the record, then the turn-table on which the record is placed, after that the point to follow the grooves and transmit the vibrations to the reproducer or sound box, which receives the vibrations from the point and passes them on, as re-embodied sound to the amplifier to be strengthened in volume and spread abroad. In connection with the horn there is also the tone arm which carries the sound from the

reproducer to the amplifying horn, and is a comparatively recent introduction.

Undoubtedly the most important factor in the reproduction of a sound in a gramophone is the reproducer of sound box, as it is commonly called. Between the original type employed on the phonograph and that now used on the disc machine there exists a considerable difference, but only in details, the principle being the same in both.

The diaphragm, which is the true reproducer, may be made of various substances such as ivory, wood, card, board, glass, etc., but mica has been found the most suitable. Any one who examines a sound box will have a round flat surface presented to him, resembling to a certain extent the dial of a watch. That is the diaphragm, and it is the vibratory movement of that circular surface which causes the sound to be sent forth. The case which is made of metals has a circular outlet in the centre. The construction of a reproducer is the setting of the diaphragm. Two rubber rings, known as gaskets, are inserted round the inner edge of the box in such a manner as to grip the diaphragm tightly between them. Then comes the fixing of the stylus bar, which is a somewhat delicate process.

The stylus bar is a little arm of steel which may be seen advancing half way across the face of the diaphragm. It will be observed that it does not touch the materials from the side to the centre, but at the precise point in the middle of the circle it is attached to the diaphragm substance, having the end more or less bent round for that purpose. The func-

tion of the stylus bar is to impart the vibration to the diaphragm which has arisen from the needle running along the track of the record. To achieve this the but of the stylus bar is mounted on a fulcrum or bridge where it receives a rocking motion from the record which is instantaneously communicated to the diaphragm at its centre, thus giving the necessary thrust and pull of vibration. There is a round opening in the backing to permit the sound to pass through when the box is attached to the goose-neck or tone arm.

Petroleum Soaps.

2418 C. B. D., Nadiad. Wants to know how petroleum soaps are made.

Soaps from paraffin oil (and other mineral substances) are made by crutching into a soap paste, 10 to 20 per cent of petroleum oil. The addition of these products to a laundry soap appears to increase its detergent effect, and greasy clothes in particular are more readily washed with paraffin soap than with an ordinary soap. Sometimes the mineral oils are not used, but instead a soft, low-class, and somewhat oily paraffin wax is employed on account of the odour being less.

Toilet Soaps.

2412. P. K. R. D., Rangoon.—Wants a good formula of toilet soap.

The following soaps made by the cold process are suitable for bath.

(1) WINDSOR.

Coconut Oil	50 lbs.
White Tallow	50 "

Caustic soda lye
at 70° Tw. 50 lb.

Oil of Caraway 6 oz.

Oil of Lavender 4 "

Oil of Thyme 2½ "

(2) VIOLET

Coconut Oil 40 lbs.

Tallow 10. "

Caustic soda lye
at 70° Tw. 25 "

Oil of Lavender 1 oz.

Oil of Bergamot 2 "

Oil of Cassia 1 "

Tincture of Benzoin 2 "

Balsam of Peru 1. "

Stir the fats which have been previously melted together with the alkali; then well mixed add the perfume

which will, of course, be indented, and show the figure imprinted on it. The next letter or stamp is now taken and stamped in like manner, and so on with the others; taking care to keep the letters in an even line with each other, like those in a book. By this operation the rosin is melted; consequently the gold adheres to the leather; the superfluous gold may then be rubbed off by a cloth, the gilded impressions remaining on the leather.

Staining Wood to Imitate Mahogany.

2285. A. C. S., Nilgiris.—Asks how to stain wood to imitate Mahogany colour.

Staining inferior wood in imitation of mahogany is quite commonly done. The method given below will answer excellently for staining deal in imitation of mahogany. First give the work a coat of raw sienna (ground in water) and oak stain, rubbed well into the grain with a piece of soft canvas or a wisp of tow. When the coat has begun to set, but before it is dry, rub it down carefully in the direction of the grain with canvas so as to remove all cross streaks. When dry this produces a brownish yellow ground, the darkness of which should be regulated by the character of the mahogany to be imitated. Rub on another coat in just the same way, but this time use burnt sienna with glue size as the medium. The quantity of sienna laid on will, of course, determine the redness of the mahogany, from a thin pale coat to a full deep red. Wipe off in the same manner as before, and when thoroughly dry rub down with a piece of

Leather Gilding.

1902. T. L., Multan City.—Wants a process of embossing gold letters on leather.

In order to impress gilt figures, letters and other marks upon leather, the leather must first be dusted over with very finely powdered dried white of egg, yellow rosin or mastic gum, upon which lay a leaf of gold. The iron tools or stamps (with engraved designs or letters) are now arranged on a rack before a clear fire, so as to be well heated, without becoming red hot. If the texts are letters they should be arranged alphabetically on the rack. Each letter or stamp must be tried at its heat, by imprinting its mark on the raw side of a piece of waste leather. A little practice will enable one to judge the proper heat required. The tool is now to be pressed downwards on the gold leaf,

canvas or worn glass paper and give a coat of red oil. Then polish in the usual way, and if the colour is not quite what is required give a coat or two of thin red polish, or red with a little black in it, laid on smoothly with a brush. For bodying up, use alternately a coat of brush polish, then polish and brown hard varnish mixed, or a special varnish, and then give a smoothing coat with the rubber.

Glazing P. O. P. Prints.

2426. T. C. A. D., Palamcottah.—Asks how to glaze P. O. P. Prints?

The printing of P.O.P. paper is done by exposing the paper under the negative in a printing frame and examining the image to see when the printing is finished. The print is usually made darker than it is ultimately desired to be, so as to allow for loss in toning and fixing. The toning is done with a solution of chloride of gold made up according to specific formulas. Usually the bath contains sulphocyanide of ammonium. On matt paper platinum toning is often employed, giving warm brown and sepia tones or a black if desired. After toning the prints are fixed and thoroughly washed and dried. If an extra glossy surface is required the prints are pressed (or, as it is technically termed "Squeegged") whilst wet into contact with a well cleaned glass plate, ferrotype plate, or papier mache slab. To prevent adhesion the plate is often polished with talc powder or rubbed with a wax solution. When dry, the prints strip off with a highly glazed surface.

To Imitate Ebony.

2285. A. C. S., Nilgiris.—Asks how to stain wood to imitate ebony colour.

The usual method is to first coat the wood with a solution of 2 oz. log wood extract, 1½ oz. copperas, 1 qt. water; add a dash of china blue or indigo; boil in an iron pot; apply hot; give several coats; then one or more coats of vinegar, in ½ pt. of which has been steeped 2 oz. steel filings or rusty nails.

Wood stained black, to imitate ebony, may be wax polished. The result is certainly a close approximation to the appearance of real ebony.

Peeling a Pearl.

2470. N. T. C., Muttra.—Asks how layers of pearls are removed and polished?

The worker takes a small pen knife, opens one of the blades, puts a couple of kid glove finger tips on the thumb and first finger of his left hand and thus equipped proceeds to peel the pearl. Holding his two hands together to steady them he presses the edge of his knife blade against the pearl until the harder steel penetrates straight down through one layer. Then with a flaking lateral motion he flakes off apart of the outer skin. Bit by bit all of the outer layer is flaked off, and that too, without appreciably scratching the next layer,—this is the test of a skilful worker. When the pearl is completely peeled it is gently rubbed with three grades of polishing paper, each finer than the previous one. The appearance is thus considerably improved. A slower and more laborious

•but safer, process of "peeling" a pearl, consists in gently rubbing the surface with a very fine, rather soft, abrasive powder until all of the outer skin has been thus worn away. It should be added that it will not do to try to peel a part of a pearl in order to remove an excrescence, for then one would inevitably cut across the layers, exposing their edges, and such a surface looks, when polished, much like a pearl button, but not like a pearl.

Shaving Soap Powder.

2455. P. K. P., Calcutta.—Requires a process of manufacturing shaving soap powder.

Shaving soap powders are pure curd soap pulverised and mixed with starch, almond paste or powdered orris-root. These additions serve a double purpose; many very sensitive skins cannot even bear pure neutral curd soaps, their use causing an unpleasant sensation of dryness. This is alleviated if soap with the above additions are used, their presence also causes the lather to be more permanent. By mixing 20 to 25 parts, of starch with 100 parts of soap powder a shaving powder is obtained which gives a fine, permanent lather. This powder is generally supplied white, but it is also coloured rose, by mixing a little cinnabar in it. Before mixing the starch into the powdered soap it is perfumed and if necessary, coloured the colour and perfume being very carefully ground up, and when thoroughly mixed up together the whole is passed through a not too fine sieve. The perfume usually employed

is a mixture of lavender oil, oil of thyme, oil of caraway and fennel oil.

Tortoise Shell.

2064. M. G. B. R., Surat.—Desires to know the working principles of tortoise-shell.

Tortoise shell is the upper shelly covering of the sea turtle, consisting of a great number of plate or blades overlapping each other like the slates of a roof. These separate blades vary greatly in size, shape, thickness, and colour, so that the most suitable application cannot be determined till each blade is examined separately. As a new layer of the substance is formed every year, the shell thickens as the animal grows older. The back shell is always better than the under or belly shell. As to which is preferred for particular purposes—rich dark-brown, markings of golden yellow, light red, pale-yellow, etc.—this is a matter of varying taste and fashion. Tortoise shell is worked up into work boxes, combs, tea caddies, snuff boxes, cabinets, spectacle cases, and numerous other articles; also for veneering on fancy cabinet work.

The remarkable properties of this substance render it amenable to many varieties of manufacturing treatment (1) Welding. Small pieces may be joined by a true welding process by scraping and thinning the edges, overlapping and pressing under the influence of heat. (2) Softening. Boiling water softens it to some degree, and facilitates many modes of treating it. (3) Sawing. When dry and cold, the tortoise shell yields easily

to the action of a fine saw. (4) Stretching. When a slit is made, and the piece softened by heat, the slit can be so stretched out and worked as to form the ring for an eye glass or spectacle frame. (5) Moulding. As the substance becomes softened by boiling water, it admits of being pressed into a multitude of forms, by the use of iron moulds, dies and counter dies; by these means boxes and ornaments of various kinds are made. (6) Pressing. There is another kind of moulding, much practised in France, whereby fragments of tortoise-shell, in the forms of cuttings, shavings, turnings, filings, dust, and the like, can be collected into a kind of stiff putty by the action of boiling water and pressed into moulds or dies. (7) Veneering. The plates of tortoise shell are often applied as a veneer to the surface of wood by glueing, the back of the veneer being painted in colours, to hide the grain of the wood and to heighten the tints of the shell. (8) Inlaying. To inlay or incrust tortoise shell with gold, silver, mother-of-pearl, etc., the latter is driven into the very substance of the former by the combined influence of softening and heavy pressure.

Crystallised Fruit.

2626. K. D., Nagri.—Requires hints on making crystallised fruit.

Crystallised fruit can be made at home very nicely. Select nice fresh fruit. Cook it a little in clear water; the amount of cooking may be soon learnt. Place the cooked fruit into very thick hot syrup, and let it stand for about two days; then drain off the syrup, which will now be very thin, and boil it down until it is thick again; put in the fruits and let it heat through and stand for about four days, then repeat the process letting it

stand longer every time. When the syrup no longer gets thin remove the fruit and dry it in the sun, or in an evaporator with gentle heat. It may be rolled in granulated sugar to fully dry it, and then may be packed in boxes for use.

Syrup for the making of crystallised fruit is produced thus: Take white grain or lump sugar and dissolve it in hot water, and then boil until a few drops taken from the mass can die upon being cooled on a pottery plate or glass. A little formic acid can be added and boiled with the sugar to prevent fear of moulding.

Uses of Borax.

2674. M. L. Tanjore.—Wants to know the uses of borax.

Borax is used to facilitate the brazing of metals; these are joined in the hot in presence of borax by an alloy formed of 2 to 5 parts of copper and 1 part of zinc. Molten borax dissolves the metallic oxides and keeps the surfaces clean, preventing further oxidation, and the alloy thus comes into direct contact with the polished surfaces of the metals and brazes them firmly together. When brazing is unnecessary the metals are soldered with an alloy of tin and lead, in which case lower temperatures are used and zinc chloride, ammonium chloride, or stearine are used as cleaning agents instead of borax. Borax is used for glazing earthen ware, though borocalcite is now preferred. It is also used in the manufacture of colouring matters, especially of anthracene dyestuffs. Further it is employed (ammonium borate best,) as a means of rendering fabrics incombustible, and serves also as a mild antiseptic; considerable quantities are used with starch in the glazing and ironing of linen.

Crayon for Writing on Glass.

2545. B. L. J., Hoshangabad.—Enquires how to write on glass.

A suitable pencil for writing may be made according to the following recipe.

Spermaceti	4 oz.
Tallow	3 "
Beeswax	2 "
Red lead, in fine powder	6 "
Melt, mix, and while hot add—	

Boiling saturated solution of Caustic potash 1 ll. oz.

Keep warm for half an hour, stirring occasionally. Pour into moulds.

The glass must be clean and dry.

Curry Powder.

2567. J. M., Ahmedabad.—Wants good recipes for curry powder.

In the manufacture of curry powder the most important point to remember is that all ingredients must be fresh and also freshly ground. Preferably they should be ground together.

(1)

Coriander	2 lbs.
Black pepper	1 lb
Turmeric	1 "
Cumin Seed	6 oz.
Fenugreek	½ "
Cumin Seed	6 oz
Cayenne	4 "

(2)

Black pepper	12 oz
Capsicum	2
Coriander	32
Fenugreek	6
Cinnamon	1
Fennel	1
Cardamoms	2
Mustard	12
Turmeric	16
Cumin	2

Spirit Gum.

2558. B. K. R., Mymensingh.—Wants a recipe for spirit gum.

Resin	1 oz.
Castor Oil	½ oz.
Rectified Spirit to	4 oz.

Dissolve and perfume. This is used in theatres for fixing moustache and the like.

Joining Aluminium Sheets.

2674. M. L., Tanjore.—Requires hints on soldering aluminium.

First put the sheets in proper position and then take apart and clean the edges of any grease or dirt with scraper or end of file. When this has been done take the small blow lamp, or use the flame of a small blow pipe, and apply heat to the edges already cleaned. Add a little metal strip of the alloy described below.

Use a small clean flame, it must not be smoky or too fierce. Use your old file to tease the metal strip on to the edges or surfaces required to meet each other, and see that all parts are dealt with as you travel along, say about 3/8th of an inch either side of where the joint will be made leaving no part undone or any beading of the metal or oxide at the outer edges which may form during the application of heat. Allow the articles to cool off; when cold, placing them together as required and securing in place to prevent moving. Then with the aid of small flame and strip of alloy run the molten metal along the joint, afterwards dressing the metal of any oxide with the edge of the spatula by passing it quickly and lightly from end to end over the surface of the molten metal before it cools.

The soldering alloy referred to above is made as follows: Tin 2; Zinc 1; Aluminium scrap ½; by parts. Melt and run into thin strips for use in repairing and soldering aluminium articles.

Cement for Glass.

2584. C. I. M. R., Udumalpet.—Wants to know a suitable cement for mending glass.

To make cement for mending glass or china without leaving black marks, mix up 1½ oz. of gum sandarac, 1½ oz. of white shellac, and ½ gill of methylated spirit.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

2335. K. T. S. J., Mysore.—Kindly repeat your queries.

2336. S. A. S., Narsingpur.—Cigar lighters and novelties may be had of Bose Dass Co, 28, Nilmoney Mitter St., Calcutta. The address of the individual is not known.

2338. T. L. B., Kashmir.—Mac Lawrie & Co., 17 Ezra Street; Baijnath Choubey, 37/39, Ezra St., both of Calcutta are well known dealers in electrical goods. Woollen goods may be had wholesale from The Muir Mills, and Elgin Mills both of Cawnpore. Porcelain wares may be had of Satish Chunder Daw & Co., 142-1, Old China Bazar Street and Ebram Peermahomed & Co., 24, Old China Bazar Street; both of Calcutta.

2339. T. S. D., Bombay.—Recipes for preparing Eau de Cologne appeared in September 1924.

2342. C. C., Madras.—Deshi Rong (in English) by Dr. P. C. Roy to be had of The Book Co., 4/A, College Square, East, Calcutta.

2343. K. A. N., Tiruvalur.—A formula for making coloured matches appeared in last September issue. A formula of dampproof glue appeared in September 1923.

2344. P. L. B., Sialkot.—There is no school for teaching art of photography. It is easily self-taught

2345. R. P., Sholapur—Celluloid articles may be had of Bose & Dass Co, 28, Nilmoney Mitter Street, Calcutta.

2346. J. S. L., Darjeeling.—Mohwa oil may be had of Panchkorie Tat, Meerbohur Ghat Street, Calcutta.

2347. J. N. S., Ranchi.—Scents may be had of Paradise Perfumery House, 75, Colootola Street, Calcutta and spices of Jodunath Ghor, Hukaputty, Barabazar, Calcutta.

2348. J. D. D., Meerut.—The elementary principles of wireless were discovered by Sir J. C. Bose. They were later developed by

Marconi. Read the Life of Sir J. C. Bose to be had of G. A. Natesan, Madras.

2349 H. R. C., Jhang—Machines for making pencils may be had of Oriental Machinery Supply Agency, 20/1, Lall Bazar Street; (2) Aerated water machines of Little & Co., 3, Grants Lane; (3) and Banyan machine of The Indo Swiss Trading Co., 27, Pollock Street, all of Calcutta.

2350. C. D. S., Darbhanga—For handpumps please enquire of T. E. Thompsen, 9 Esplanade and W. Leslie & Co., 19 Chowringhee; both of Calcutta.

2352. S. S. R. A., Tholampalayam.—Wire nail making machines may be supplied by National Machinery Co., Ffin, Ohio; Sleeper & Hartley Inc., Worcester, Massachusetts and E. W. Bliss & Co., Brooklyn, New York; all of U. S. A. The machine suppliers will give directions for working the machine.

2353. S. R. S., Kumbakonam—Process of preparing sugar candy appeared in October 1926 issue.

2356 K. G. M., Masulipatam—Addresses of newspapers and periodicals of France and Germany appear elsewhere in these columns.

2358. J. M. R., Udumalpet.—Mechanical engineering requires practical training so it is not possible to master the subject simply by reading books at home. For training in mechanical engineering you may try the various workshops of railway departments. Books on mechanical engineering may be bought of Book Co., 4/4-A, College Square and Thacker Spink & Co., 3, Esplanade, East; both of Calcutta. Chemicals you require may be had of B. K. Paul & Co., 1/3, Bonfields Lane and C. Biswas & Co., 125, Bowbazar Street; both of Calcutta.

2359. P. C. B., Belgaum.—Laundry machines may be bought of Symington Cox & Co., Mercantile Bldg., Lall Bazar Street, Calcutta.

2360. K. K. B. L., Lucknow.—Vegetable product may be supplied by Ralli Bros. & Co., 1 & 2, Church Lane; E. D. Sasoon & Co., 100, Clive Street; Graham & Co., 9, Clive Street and Andrew Yule & Co., 8, Clive Row; all of Calcutta. Sheet metal may be bought of Balmer Lawrie & Co., 103, Clive Street. Glass bangles may be supplied by Md. Abdul Gaffar, 133, Canning Street and F. Nalladaroo & Co., 50/1, Canning Street; both of Calcutta. Matches may be bought of H. Rashid & Co., 65, Zakaria Street, Calcutta. Toys may be had of K. B. Nan, 233, Old China Bazar Street, Calcutta. Other addresses you want will be found elsewhere in these columns.

2361. T. K., Kuttaparamba.—Crackers are manufactured by Helbig & Co., Bruchsal, Germany; G. Heck, S. Alexandrinenstrasse 35, Berlin, Germany and Hering Carl & Co., S. O. Copenickerstrasse 109-A, Berlin, Germany.

2362. A. J. S. R., Tuticorin.—Fishing hooks may be supplied by Calcutta Stores, 7/1, Tagore Castle Street, Calcutta.

2363. C. N., Laitkynseu.—Wants to be put in touch with dealers in chaulmoogra seeds, coffee, citron fruit, arrowroot seed, cassia leaves and myrobalans.

2364. B. V. R., Bros., Tirupur.—Photo goods may be supplied by Alleany Chemical Co., Alleany, New York; Mallinckrodt Chemical Works, St. Louis, Mo and G Cramer Dry Plate Co., St. Louis, Mo; all of U S A. Carbon dioxide may be supplied by The Deccan Sugar & Abkhari Co., Ltd, Samalkot and Cawnpore Aerated Gas Co., Ltd, Begg Sutherland & Co., Ltd, Cawnpore. Derby sweep tickets are sold among the Members of the Royal Calcutta Turf Club, 12, Russel Street, Calcutta.

2365. W. L. C., Madras.—Uses of tortoise shell appear elsewhere in this issue.

2367. N. H. B., Nagpur.—Further particulars of determining sex before birth are not available as it is still in its experimental stage. As the weight of gelatine and chrome alum is given the question of the strength of the solution does not arise. Process of removing various kinds of stains appeared in October 1926 issue.

2368. D. U. P., Chalisgaon.—For catalogue write direct to the party.

2370. Z. A., Bombay.—It you go through the Sale & Exchange pages of **Industry** you will find the addresses you require.

2371. S. M. M. A. C. C., Jaffna.—For the notes of Latin book mentioned by you write to Thacker Spink & Co., 3, Esplanade East, Calcutta. For other notes enquire of Chakraverty Chatterjee & Co., Ltd, 15, College Square and Book Co., 4/4-A, College Square; both of Calcutta. For the book you require enquire of G. Natesan & Co, Madras.

2373. F. D. M., Ghatal.—Take expert advice.

2374. D. D. H., Simla.—Stationery articles and paper may be bought of Nilmoney Halder & Sons., 106, Radha Bazar Street, Calcutta and Ghose Bros., 63-J, Radha Bazar Street, Calcutta.

2375. P. T. C., Ahmedabad.—To communicate with any querist write him direct with number and initials under care of **Industry** when your letter will be duly redirected.

2377. K. V. C. R., Guntur.—Envelope making machines and vermicelli making machines may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. A good process of silvering mirror will be found in October 1926 issue. For your other query consult an Ayurvedic physician.

2378. N. K. N., Rajahmundry.—Process of preparing peppermint lozenges appeared in the last September issue.

2379. K. V. R. R., Vizagapatam.—For books on biscuit manufacture and peppermint manufacture enquire of Chakraverty Chatterjee & Co., Ltd, 15, College Square, Calcutta.

2380. K. R., Hoshiaipur.—Tin boxes are made by Gajanand Rampratap, 6, Halsi Bagan Road, Calcutta.

2381. P. S. B., Papur.—For learning weaving, dyeing, etc you may write to the Principal, Government Weaving Institute, Serampore, Howrah. There is no school that gives training in glazed pottery works.

2382. H. M. D., Bombay.—Only suggestion for saving coal appeared in the Columns of

Scientific and Industrial Topics It is still in its experimental stage

2385 K N E K M, Thottapalayam—We have got no book on match manufacture. You may, however, go through *Match Industry in India* by K C Sen, to be had of the author at 7, Biswakosh Lane, Bagh Bazar Calcutta

2386 K L T T, Rutlam Jancy goods may be supplied by G. Buchner, Marknenkirchen, Germany. To communicate with any advertiser write him quoting reference number under care of **Industry** when your letter will be duly redirected. We are not aware of the reliability of the firm mentioned by you

2387 K R, Calcutta—For learning soap manufacture you may write to the Principal of the School of Chemical Technology, Neebpoor Lane, Calcutta

2388 M M S S, Delhi—Wants to be put in touch with firms dealing in detective's equipment such as oil, membranes for anointing and sticking on face, some special kinds of caps that can be frequently changed

2389 S K C, Calcutta—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta

2390 K B, Roorkee—Wants to be put in touch with suppliers of **moongphali**. To manufacture cyclostyle paper highly expensive machineries are required. An article on photographic plates appeared in October 1926 issue. Hektograph pad may be made with glue. For preparing black hektograph ink take methyl violet 10 parts, metosine 20 parts, glycerine 30 parts; gum arabic 5 parts and alcohol 60 parts

2391 K M A, Vrindunagar—Wood carving is taught in the School of Industry, Ratnagiri. Wants addresses of firms doing wood-carving. For book on wood carving enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta

2392 S B, Bikaner—Refer your query to L' Association Nationale d'Expansion Economique, 23, Avenue de Messine, Paris, France

2393 B K R, Purnea—Iron chains are manufactured by D R Puri & Son, Gujrat, Punjab

2394 K L S C, Kaimganj—Wants to know the address of sole agent of Dietz lantern in Bombay. Desires to buy sunlight soap and Bear's Elephant cigarettes. Commission agents of London are R H Frank Parker & Co, 20, Cullum Street, London, E C 3

2395 A S A, Gujrat—Process of silvering mirror will be found in October 1926 issue. Other recipes you want being of patent articles are not known

2396 K G S, Rajkot—For enamel paints and colours you may enquire of Kailash Chandra Dutt & Co, 20, Bonfields Lane, Calcutta. An article on how enamelling on gold is done in Assam appeared in August 1923 issue. There is no such institution. For learning the art of enamelling, try to be an apprentice in a jewellery shop. For the books required enquire of Thacker Spink & Co, 3, Esplanade East, Calcutta

2397 M S V, Tilyari—For tin box making machines write to Taylor & Challen, Birmingham, England. Button making machines may be supplied by Frederick Osann Co, New York, U S A. Soap stamping and envelope making machines may be had of Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta

2398 S S T, Makrandnagar—A good formula of tooth powder will be found in March 1925 issue. Chua may be bought of Jadu Nath Ghar, Hukapatty, Bara Bazar, Calcutta. Spermaceti may be had of B K Paul & Co, 113, Bonfields Lane, Calcutta. Worcester sauce is a kind of edible sauce. Lime juice glycerine is used as cosmetic. Tooth paste is used for cleansing teeth. Disinfecting fluid is used for the purpose of drying away and killing germs and poisonous elements. A good recipe of flora jasmine will be found in August 1926 issues

2401 N D B, Patna City—A good formula for blue-black ink appeared in June 1923 issue

2402 B D D S, Meerut—For picturesque label enquire of Calcutta Fine Art Cottage, 76, Dharantola Street, Calcutta and Maneklal Maganlal & Co, 719, Cowasji Patel Street,

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2403. K. A., Asansol—There is no Ayurvedic college known to us where students are allowed to take correspondence course and to appear in the examination.

2405. K. S. M., Bombay—For books on colloquial English enquire of Tacker Spink & Co., 3, Esplanade East, Calcutta. For copy book write to Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

2406. K. T. S. I., Mysore—Books on electricity and magnetism may be bought of Tacker Spink & Co., 3, Esplanade East and the Book Co., 44-A, College Square, both of Calcutta. Please explain your other queries more clearly.

2407. R. C. P., Salampur—For securing loans on securities write to Bengal Central Loan Co., Ltd., 2, Lall Bazar Street, Mahajan Banking & Trading Co., Ltd., 7/B, Clive Row and Luxmi Industrial Bank, 80, Chowmehchee Road; all of Calcutta. You may refer your other query to the Kalpataru Ayurvedic Pharmacy, Grey Street, Calcutta.

2409. T. A. S. P., Tanjore—If you just go through the advertising pages of **Industry** you will get all the addresses you require.

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Vol. XVII. No. 201.

2413. T. S. C. D., Sanand.—A good recipe of pain ointment will be found in January 1926 issue. Python eggs are composed of sulphocyanide of mercury which may be bought of any chemists' shop. Mix the material to a paste with water and roll it into balls without any other addition, drying thoroughly. The stuff is highly poisonous as also the gas evolved on ignition. One must be careful in playing with them.

2417. A. M. Q., Wazirabad—Button making machines are used in manufacturing buttons. Process of handling the machine in an efficient manner will be supplied by the manufacturer. If you take foreign machine you will have to engage an expert mechanic who will help you in working it.

2419. M. D. G., Cuttack—An article on bird making appeared in May 1925 issue. If you go through it you will be able to manufacture various kinds of bird with the recipes given there.

2421. B. M. B. C., Ahmedabad—A new recipe for making face cream and formula for pharaoh's serpent will appear in an early issue. Hindi equivalents of chemicals are not known. Your other query is in the nature of an advertisement.

2422. M. I., Ellore—To communicate with any quackist write him with number and initials under care of **Industry** when your letter will be duly redirected.

2423. O. K. M., Baroda—Refer your first two queries to a physician. Yes you may use **simra** cotton in bedding. Ford Motor Works of U. S. A. will not supply you motor cars direct as they have their agent in India. For particulars you may write to Ford Motors Ltd., 110/1, Russa Road, Calcutta. Can supply **simra** cotton.

2424. M. S. M. W., Tondiyarpur—A workable suggestion for manufacturing Bengal matches has been published in the last September issue of **Industry**. No exact recipe is available.

2425. T. D. R. B., Colombo—Oil cloths are manufactured by Bengal Waterproof Works, Ballygunge; Mermaid Waterproof Works, 162,

Lower Chitpur Road, both of Calcutta and Standard Oil Cloth Co., 201, Raja's Deory, Dacca. Coatings, shirtings and other piece-goods are manufactured by the Muir Mills, Cawnpore.

2426. Y C A J D, Palamcottah—You perhaps mean collapsible tubes which may be bought of B K Paul & Co, 113, Bonfields Lane, Calcutta. Envelope making machines may be supplied by Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta. To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected.

2427 L G D, Gadag—Formulas of printing ink and varnish will be found in May and June 1925 issues of **Industry**.

2429 S A C, Etaiyapuram—For deodorising coconut oil two methods are in vogue. The first consists in washing out the odoriferous bodies with alcohol which removes the fatty acid while the other consists in volatilisation by steaming, steam under high pressure is passed into the fluid oil for two or three hours and the non-volatile fatty acids left are then removed by adding 0.25 per cent of calcined magnesia and the magnesium soap formed is then skimmed off the surface.

2431 S V I, Vayalpad—Wants to be put in touch with secondhand woollen clothing merchants of London, America and Germany.

2434 J V, Bellary—For wigs enquire of Kunja Lal Pal, 318, Upper Chitpore Road and Atul Chandra Pathak, 118, Upper Chitpore Road, both of Calcutta.

2435 B C M, Bangalore—Plaster of Paris may be bought at any chemist's shop. You may, however, try C C Biswas & Co, 125, Bowbazar Street, Calcutta, H S Abdul Gunny & Co, Princess Street, M. Maganlal & Co, Damodar Bldgs, Princess Street and H R Mody & Co, Princess Street, Kalbadevi, last three of Bombay.

2436. G V C, Narasapur—Manufacture of imitation precious stones is a very difficult and intricate process involving uses of electric furnaces of very high temperature. Hence it is advisable not to launch upon such a risky enterprise as you are new in the line. Imitation

gold can not be equal to real gold in its properties. A good formula of imitation gold will appear in an early issue of **Industry**.

2437 M R. C. N., Bellary—Wick-making machines may be supplied by Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta. For camera write to Calcutta Photographic Stores & Agency Co., 154, Dharamtola Street and Calcutta Camera House Chowringhee, both of Calcutta. For starting cinema business on a small scale write to the writer of the article direct who will supply you with all the necessary information.

2439 A A A, Madras—The recipe you want is not known as it is a trade secret. A good recipe of pain ointment will be found in January 1926 issue.

2440 R B L, Meerut—For plantain fibre extracting machines and grinding machines write to Oriental Machinery Supply Agency Ltd, 201 Lall Bazar Street, Calcutta.

2441 R D J, Almora—Xmas and New Year cards and pocket diaries may be had of Thacker Spink & Co, 3, Esplanade East, Calcutta.

2444 Ismail Sheriff & Co, 102, North Bridge Road, Singapore. For manufacturing sola-pith hats and steel trunks try to be an apprentice or engage a mechanic who will help you in mastering the art. No further particulars of the society of science graduates are known.

2445 B C D, Sylhet—For selling canes you may correspond with the following cane merchants of Calcutta—Malayan Cane & Timber Co, 10, Sukeas Lane, Kamari House; Datta Choudhuri & Co, 129, Corporation Street and S Mahomedbhoy & Co, 10, Sukeas Lane, Kamari House, all of Calcutta.

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2446. B. A. A. Katak.—Wants to be put in touch with dealers in pure besewax, honey, stag horn and hoofs and bones of all animals.

2447. T. F. W. Shwedaing.—Diamonds are supplied by Smit Anton & Cie, Amsterdam, Holland; S. Hamburg, Swammerdamstrasse 21, Amsterdam, Holland; G. C. Sloger, Sarphatipark 70, Amsterdam, Holland; Johnson, Walker & Tolhurst Ltd., 83, St. Lersgate Street, London, E. C. 1; B. Oppenheimer, Hatton House, 20 & 23, Holborn Viaduct, London, E. C. 1.

2448. S. B. S. R., Secunderabad.—The correct address of Commercial Library is 1, Council House Street, Calcutta. The address of Director of Commercial Intelligence is the same. Blue elour may be bought of Aminchand Mehra & Sons, 34, Armenian Street, Calcutta. The German dye you want may also be supplied by the above firm. Indigo may be bought of Jadu Nath Ghar, Hukaputty, Barabazar, and Banshidhar Dutt & Sons, 126, Khengraputty; both of Calcutta. To ascertain strength of a certain solution use hydrometer.

2449. N. S., Jhansi.—Wants to be put in touch with wholesale merchants of cut pieces of woollen, cotton and silk cloths.

2450 K. T., Taffna.—For making colour fast you have to undergo certain processes when dyeing yarn and cloths. Process of dyeing with fast colour will be found in August and September 1925 issues of Industry which you may consult with some benefit. You may use ordinary colour to be had of Aminchand Mehra

& Sons, 34, Armenian Street, Calcutta.

2451. K. B. K. Agra.—Diamonds may be bought of S. N. De, P. O. Box No. 100, Calcutta.

2454. K. N. M. S., Allahabad.—You may start an aluminium utensil making factory with Rs 25,000. Rs 5,000 will be too small as the machines, etc will cost more than that. You have to use sheet metal machines which may be supplied by Taylor & Challen, Birmingham, England.

2456. L. T. T. C., Srinagar.—To communicate with any querist write him with number and initials under care of Industry when your letter will be duly redirected.

2458. G. A., Hyderabad.—For learning block making try to be an apprentice. You may write to Calcutta Fine Art Printing Syndicate, 3, Jorapukur Lane, Calcutta to that effect. For implements used in block making enquire of Calcutta Photographic Stores & Agency Co., 154, Dharamtola Street, Calcutta.

2459. M. A. R., Vizagapatam.—You perhaps mean cream separators which may be supplied by Indo-German Trading Co., 11, Dalhousie Square, W. Leslie & Co., 19, Chowringhee Road and The Swedish Trading & Engineering Co., 13/3, Old Court House Street; all of Calcutta. For fur cloth suitable for cap manufacture enquire of Bhisha & Co., 111, Radha Bazar Street; Eusoph & Ashfaque, 11, Colootola Street; and Shimwell & Bros, Radha Bazar Street; all of Calcutta. Process of gilding appeared in April 1923 issue. For small typewriter enquire of Frolio, P. O. Box 237, Bombay. Wants to purchase bricks.

2460. S. S. G., Bikaner.—German colour may be supplied by Amin Chand Mehra & Sons, 34, Armenian Street and Hansraj Vishram, 13, David Joseph Lane; both of Calcutta. Gargoyle mobil oil may be supplied by Vacuum Oil Co., 2, Clive Row, Calcutta. Match composition is applied to the end of the match sticks. Recipe of this composition will be found in September 1923 issue of Industry. Process of preparing dyeing soap appeared in November 1924 issue. Matches are manufactured by M. G. Kale, Arde Chawl, Agra Road, Chhatrapur, Bombay.

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INDIAN DRUG & CHEM. CO.
10, Cross Street, Singapore.

2462 S W. K, Nizamabad—Indigo may be bought of Ramchand Chottay Lal, 46, Shib Thakur Lane, Daccapatty, and Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar, both of Calcutta

2463 K D T, Kheji-Lakhimpur—For securing agencies go through the Sale & Exchange pages of **Industry**.

2464 A R S, Alangadu—Homeopathic medicines and books may be had of King & Co, 83, Harrison Road and C Ringer & Co, 4, Dalhousie Square; both of Calcutta

2465 D V Somepeta—For metal ceiling enquire of S N Mullick & Co., 77, Clive Street and P C Mitter & Co, 98, Clive Street, both of Calcutta.

2467 A K C, Vizianagaram—The sole agent for cobra boot polish is Hoare Miller & Co, 5, Fairlie Place, Calcutta For rubber soled shoes enquire of Kippers Co, Ltd, 94/1, Clive Street, H Hobbs & Co, Esplanade Row East and Watts & Co, 15/6, Chowringhee East; all of Calcutta Boot polishes of various kinds are stocked by Chandra & Co, 70, Bentinck Street, Calcutta Almost all the shoe merchants carry out mofussil orders Lame lined glycerine is imported by Bathgate & Co, Old Court House Street, Calcutta

2468 S R, Cocanada—Boot laces are manufactured with a machine which may be supplied by Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta No further particulars of the charka are available You may apply lime to the soil as manure Recipes of scented 'chand' appeared in December 1925 issue Refer your query regarding flies on cattle, dog, etc. to a veterinary physician

2469 S I. C, Muzafferpur—The machine you require may be indented by Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta on your behalf You may correspond with the firm.

2470. M. I., Pabna—It will not be profitable for you to manufacture coarse molasses known as "chit gur" in Bengali Procure it from wholesale dealers of molasses

2471 R. L. A, Lucknow.—Glass bottles may be supplied by Mizuochi & Co., 75,

Nichome, Kita-Kyuhoji-machi Higashiku, Kyoto and Kasai Bros. & Co, 2, Chome, Sannomiyacho, Kobe, both of Japan.

2472 A. J S, Baghdad—Ayurvedic medicines may be bought of Dacca Shakti Oushadh alaya, Beadon Street, Calcutta and Kalpataru Ayurvedic Pharmacy, Grey Street, Calcutta.

2474 S K S R, Salavapur.—For second-hand directories write to Thacker Spink & Co, 3, Esplanade East, Calcutta.

2475 D T C, Ahmedabad.—Perhaps hydrogenation plant has not been installed and worked by any firm in India except Tata Oil & Mills Co, Ltd

2476 A N B, Quetta—You may start hosiery manufacture with Rs 1000 on a small scale Hosiery yarn may be bought of E B Bros & Co, 11, Dharamtola Street, Calcutta

2479 J H J, Garhiyasim—Directory of India may be bought of Thacker Spink & Co, 3, Esplanade East, Calcutta For brass seal enquire of B N Bysack & Co, 1/1, Ramchandra Ghosh's Lane, P O Beadon Street, Calcutta

2480 C L B, Perozepore Cantt—Thacker's Indian Directory will serve your purpose, refer to No 2479 above

2481 V V V, Imjalakuda—Your query is unattainable

2482 N J, Jodhpur—Hydrochloric acid and methylated spirit may be had of C C Chawla & Co, 125, Bow Lazar Street and Champaklal & Bros, 72, Canning Street, both of Calcutta Cotton seed oil may be supplied



**Cheapest House For
SPORTING GOODS
Silver Medals, Cups &
Shields.**

**Fine Silver Medals in
Velvet lined cases.**

Rs. 3-12 each.

**Largest Stock & Variety
Illustrated Lists Free.
CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

by Anderson Wright & Co, Strand Road, Calcutta. Chlorinated lime is bleaching powder, formula of which will be found in November 1922 issue.

2485. T S C, Colombo—Can supply ceylon tea in very large quantities.

2489 M L M C, Multan City—Wants to know the address of Titvala Match Manufacturing Co, Santacruz Match Works and Borivli Match Manufacturing Co. Will any of our readers communicate to him the proper addresses? Your other queries are in the nature of an advertisement, hence these should not be published in these columns.

2494 C J T S, Amalapuram—Carpets are manufactured by Ramlall Rambilas, Medhoram Road, Mirzapur, U P. Rahmatulla & Bros, Dakhin Phattak, Mirzapur and S Salamuttullah, Dakhin Phattak, Mirzapur.

2496 N D, Meerut Cantt—You may mail circulars with proper postage, but if you intend to start a magazine you have to register it for concession of postage and to make a declaration before the District Magistrate for which take legal advice.

2497 E V U B, Palam—It is not possible to publish all the addresses you require. If you go through these columns regularly you will find almost all the addresses required. Lead pencils, eraser, penholders, drawing paper, etc may be bought of Nilmony Halder & Co, 106, Radha Bazar Street, Calcutta. Beads of all kinds may be supplied by Ammchand Mehra & Sons, 31, Armenian Street, Calcutta. Transfer pictures may be bought of Calcutta Stores, 7/1, Tagore Castle Street, Calcutta. Silk cloths may be supplied by Nagar Bros, 21, Golagate, Benares City; Bhagalpur Silk Store, Sujaganj, Bhagalpur and Sasanka Shekhar Bagchi, Khagra, Murshidabad.

BOSE & COMPANY

General Order Supplier & Dealers In:

All sorts of Canes, Bamboo Root Polo Balls & Raw Products & etc. The best house for plating orders. If you are in need of anything please to book your order with.

BOSE & COMPANY,

23 Ram Rattan Bose Lane, Shambazar, Calcutta.

2498. Z A., Bombay.—For the book you require you may write to Thacker Spink & Co., 3, Esplanade East, Calcutta. Novelties you want may be supplied by Mahomedbhoy Jivabhoy & Co, Nizam Street, Bombay No. 9.

2499. A S, Shahhdara.—Please state your requirements clearly.

2500 *B I. S, Hardwar—Reply to your queries will be found under No. 1636 in September 1926 issue.

2501 C V H. R, Masulipatam—The address of Dr. P Nandi is 11, Upper Circular Road, Calcutta.

2504 S P, Kandy—If you go through the article on cigar and cigarette manufacture that appeared in September 1920 issue you will get a clear idea of the process of manufacturing them. But for special knowledge engage an expert.

2505 G B B, Calcutta—For secondhand small oil engines enquire of Biswakarama Agency, 84A, Chive Street, Calcutta. For mastering the art of tailoring write to Calcutta Commercial Coaching Institute, College Street Market and Mahuraja Cassurba a Polytechnic Institute, 1, Narail Bose Lane, Baghbazar, both of Calcutta.

2506 A S, Rampur State—For the machine required write to Textile Machinery & Stores Co, 61, Apollo Street, Fort, Bombay.

2507 G C G, Lucknow—Recipes of hair tonic and hair restorer will be found in July 1924 and May 1925 issues respectively.

2508 A H, Aligarh—For silk handkerchief enquire of E. B Bros & Co, 11, Dharamtola Street, Calcutta. For paper handkerchiefs enquire of Chandra Mohan Sur & Co, Radhabazar Street, Calcutta. Wants to be put in touch with manufacturers of buttons, rings, sleeves, studs, etc in Hyderabad, Deccan.

2509 S. K. M, Bombay—For organising lottery take permission from the Government. Directories may be supplied by Thacker Spink & Co, 3, Esplanade East, Calcutta. For voter's list of Jubulpore write to the local Municipal Office. For other information consult Imperial Gazetteer.

2510 M M., Quetta—Condensed milk may be supplied by Australian Milk Products Co., Ltd., 115, Pitt Street and Bacchus Marsh Concentrated Milk Co., Ltd., 1, Bond Street, both of Sydney, Australia. Recipes of vaseline pomade will be found in September 1924 issue.

2511 N K V., Dhanapuram—Process of preparing incense sticks will be found in May 1924 issue of **Industry**. Other recipes you want will appear in an early issue.

2512 B S., Dehra-Dun—You may go through Indian Tobacco and Its Preparation published by this office.

2513 D P L., Cawnpore—Best Indian tobacco is grown in Guntur and Burma. An article on cigarette manufacture appeared in September 1920 issue. You may go through Tobacco World published by Heywood & Co., Ltd., 150, Holborn, London, E C.

2514 J I W., Tiruthahalli—Indian films may be had of J F Madan & Co., 5, Dharamtolla Street, Calcutta. Swadeshi goods may be supplied by Matru Bhandari, Steeman Market Cornwallis Street, Calcutta.

2515 U T M C., Baran—Dental supplies may be supplied by Consolidated Dental Manufacturing Co., New York, Dentists Supply Co., New York & Ritter Dental Mfg Co., Rochester, New York; all of U S A. Optical goods may be bought of Stephens & Co., Ltd., 275, Bow Bazar Street, Calcutta, Dupaul Young Optical Co., South Bidge, Massachusetts and Stevens & Co., Inc., Providence, Rhode Island, last two of U S A. Engraver's tools may be supplied by L. Bysack, 5, Old Court House Corner, Radha Bazar, Calcutta, and Millers Falls Co., Millers Falls, Massachusetts, U S A. Process of distilling methylated spirit from wood has been discussed in September 1925 issue of **Industry**. A suggestion for the tools and machineries required has been dealt with. An article on electroplating will be found in November 1923 issue. In place of oat meal you may use ordinary starch. As regards water bath the second process is preferable. In the preparation of floral ottos put the flowers and sandal oil in the sun during day and in some covered place during night and not in dew as directed. Sandal oil is manu-

factured by Sandal Wood Oil Factory, Sankey's Lodge, Bangalore, Mysore.

2516 R S C., Calcutta—For blocks and designs of blocks you may try Government report regarding lac cultivation and illustrated bulletins. For these bulletins enquire of Central Book Depot, 8, Hastings Street, Calcutta.

2517 D M H., Devanahalli—Amrutnanjan being patent medicine, its recipe is not known. However a recipe of pain ointment will be found in January 1926 issue. You may consult Dictionary of Economic Products of India by Watt to be had of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. Process of preparing glycerine will be found in December 1925 issue.

2519 P A R., Godavari—Ayurvedic medicines may be bought of Dacca Sakti Oushadhi-alaya, Dacca and Kalpataru Ayurvedic Pharmacy Grey Street, Calcutta. The following is a list of chemists of U S A—Albany Chemical Co., Albany, New York, Kachnum Drug Co., New York, Rumford Chemical Works, Providence, Rhode Island, United Drug Co., Boston Massachusetts, Moore Chemical Corporation New York, and Lambert Pharmaceutical Co., Mt. Louis, Mo.

2521 K B Razole—Gold thread may be bought of Tushul Gold Thread Mfg Co., Ltd., Benares. India Gold Thread Mill, Manavaran, Chingleput, Madras and Gently Premier Gold and Silver Thread Factory, Delhi. Imitation silk thread may be bought of E B Bros & Co., 11, Dharamtolla Street, Calcutta.

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SWADESHI INDUSTRY.

Purchase KIRLOSKAR PUMPS.

Write for full particulars to Sole Agents— for India, Ceylon, etc

K. B. JOSHI & CO.,

321, Hornby Road, Fort, Bombay,

Post Box No 534.

Calcutta—84A, Clive St.,

Post Box No. 675

Karachi—Bunder Road,

Post Box No 230

Madras—Post Box No 1260

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices.



2522 I. P., Salem—An article on halftone block making appeared in February 1923 issue. Implements for starting the business may be supplied by Calcutta Photographic Stores & Agency Co., 154, Dharamtola Street, Calcutta. Process of preparing peppermint appeared in February 1925 issue.

2523 H. S. R., Bolgarh—It will not be advisable for you to manufacture hingul, rasasindu and rasamanik as these are of Kavaraj preparation involving intricate and troublesome process. Those articles may be bought of Jadu Nath Ghar, Hukkapetty, Barabazar, Calcutta. You may work out the formula that seems to you cheapest of all. For manufacturing slate pencils you may use perforated plate of any metal. Perforated plate means plates having holes in it. For slate powder etc enquire of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

2525 M. K. Rajput—As the sewing machine manufacturers mentioned by you have their agents or branch offices in India they will not make direct transaction with you. Singer Sewing Machine may be bought of Singer Sewing Machine Co., Dalhousie Square, Calcutta. Sewing machine spare parts may be bought of Contractor Bros., Kanpith Bazar, Surat. Durkopp sewing machine may be supplied by Durkopp-Werke A-G, Friedrichsgrasse 15 Chemnitz, Germany. For other kinds of sewing machine enquire of Indo German Trading Co., 11, Dalhousie Square and Indo-Swiss Trading Co., 27, Pollock Street, both of Calcutta.

2529 I. T. A., Rajahmundry—It appears that you desire to instal a well-equipped plant for the proper exploitation of ocher. In that

case it would be advisable for you to consult Martin & Co., Clive Street and Marshall Sons & Co., Ltd., Clive Street, both of Calcutta.

2530 M. P., Mandalay—Refer your query to The British Homeopathic Association, Chalmers House, Russell Square, London W. C.

2531 I. P. E. C., Madras—Your enquiry being in the nature of an advertisement should not be published in these columns.

2532 S. B. S., Salur—Banian knitting machines may be bought of W. H. Brady & Co., 26, Strand Road, Calcutta and Indo Swiss Trading Co., 27, Pollock Street, Calcutta. Banians are manufactured by Pabna Silpa Sanjibani Co., Pabna; Calcutta Knitting & Woollen Mills, 28112, Bowbazar Street, Calcutta, and Bharat Lakshmi Hosiery Mills 125, Bowbazar Street, Calcutta.

2535 H. L. V., Dera Ismail Khan—Reply to your previous letter will be found in October issue under No 1957 in Brief Queries & Replies columns. For securing agency go through the Sale and Exchange pages of **Industry** where you will find many firms advertising to secure agents.

2537 B. B. Kasauli—A good recipe of curry powder will be found in November 1923 issue.

2538 M. S. Y., Tawwi—An article on electroplating will be found in November 1923 issue which you may consult with benefit.

2539 A. I. P., Rajapur—F. O. B. Bombay quotation means that the seller undertakes to bear the cost of transportation till the goods are placed on the vessel. In addition the seller must meet all the costs involved in preparing the goods for shipment; pay all rail freight, dock and lighterage charges involved in placing the goods aboard the outbound vessels; be responsible for all loss or damages suffered by the goods until they have been placed in board. For further information on the subject consult the December issue of **Commercial India** the sister journal to **Industry**.

2540 G. R., Alamuru—Aluminium utensils are manufactured by Indian Aluminium Co., Triplicane, Madras; Victoria Aluminium Works,

SETT DEY & Co

ORIGINAL HOMEOPHARMACISTS,

42 Strand Road, Calcutta.

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations

Catalogue Free On Application.

Ghoosery, Salkia and Aluminium Mnfg Co, Dum Dum Porcelain jars are manufactured by Calcutta Pottery Works Ltd, 45, Tangra Road, Calcutta, Gwalior Pottery Works Ltd, 2-A, Radha Prosad Lane, Sukea Street, Calcutta, and Sorab Dalal Tile Works, Kathiawar Agricultural Machineries may be supplied by The Planters' Stores & Agency Co, Ltd, 11, Clive Street, Calcutta Cream separators enquire of Indo German Trading Co, 11, Dalhousie Square, Calcutta, Indo Swiss Trading Co, 27, Pollock Street, Calcutta and The Swedish Trade and Engineering Co, 133, Old Court House Street, Calcutta For motor buses enquire of Allen Berry & Co, Ltd, 21 Park Street, Calcutta Cycles may be supplied by Beck & Martens, Gansersmarkt 5355, Hambro, Germany, A Ahlert & Berg Co, b H 'nd, Germany, Hermann Beck & Co, Karlstrasse 24, Karlsruhe, Germany, Main Cycle and Mfg Co, Middletown, Ohio, U S A and Hendee Mfg Co, Springfield, Massachusetts U S A

2543 M A S Chidlapati—Nimon Senrio Kabushiki Kaisha, 199-2, Kasugadecho, Nishi-ku, Osaka, Japan and Schonlank & Co, St Benet Chambers Fenchurch Street, London E C 9 deal in indigo

2544 K B, Faizpore—Tea may be bought of N L Pault & Bros, 108, Cornwallis Street and Mukherjee Bros, 17/19, Shambazar Bridge Road; both of Calcutta

2546 G D J, Abuora—Stationery articles may be bought of Nilmonoy Halder & Co, 106, Radha Bazar Street, Calcutta Balloons, transfer pictures and toys may be supplied by Calcutta Stores, 7/1, Tagore Castle Street, Calcutta Picture frames, glass sheets and other requisites may be bought of Hem Chandra Chandra, 10, Swallow Lane and Fotie Hall Seal, 16, Swallow Lane; both of Calcutta Pictures may be bought of Roy Babaji & Co, 182, Lower Chitpur Road, Calcutta

2549 D C, Jullundur—The chemicals you want may be bought of C C Biswas & Co, 125, Bow Bazar Street and B K. Paul & Co, 1/3, Bonfields Lane; both of Calcutta For anointing lips you may use edible colour. One gill equals $1\frac{1}{2}$ chhatack in Indian weight.

2550 M. R B, Bhera.—Recipes of hair destroying powder and soap appeared in the last August issue It will be advisable for your to manufacture depilatory. As regards label etc you may try Calcutta Fine Art Cottage 76, Dharamtola Street, Calcutta as importing from Germany will not be profitable unless you order for large quantity at a time For printed tin boxes write to Calcutta Colour Printing Works, Post Box 6772, Calcutta For correspondence course you may write to The School of Simplified Studies, 17, St Paul's Chambers, 19-2, Ludgate Hills, London, E C 4.

2551 R P A, Delhi—For tin printing expert knowledge is required It cannot be acquired only by reading books without undergoing any practical training For books on tin printing enquire of Thacker Spind Co, 3, Esplanade East, Calcutta

2552 C P, Bhowali—Motor driving is taught by French Motor Car Co, Ltd, 24/3, Lower Circular Road and Indian Automobile Institute, 75, Bentinck Street, both of Calcutta For motors of latest pattern enquire of the above firm

2553 N T C, Muttra—Wants to be put in touch with dealers in feather and Australian wooden flowers

2555 D R, Vizianagram—Your postcard was rejected as it was insufficiently stamped Refer your other query to the Secretary, Lateet Light Culture, Tinnevely

2556 M Y, Lahore—Prospects of a good printer are increasing day by day, hence you may qualify yourself as a master of printing industry in foreign countries

2557 B L S, Dadri Mandi—Process of preparing artificial assafoetida will be found in July 1923 issue Wants a capitalist with Rs 2,000 to invest in a profitable business

2559 P F G, Ernakulam—Caustic potash may be bought of Calcutta Chemical Co, Pandit Road, Ballygunge and Bengal Chemical & Pharmaceutical Works, 15, College Square; both of Calcutta Soap dies may be supplied by Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. A match expert wants services in a match factory.

2560 B. H. S., Khammamett—Refer your first query to the Education Member of your province. The address of Prof. Sekhar is Ellore, West Godavari. As regards astrological prediction you may write direct to the professor.

2561. L. B., Latus—Kelly's Directory may be bought of Kelly's Directories Ltd, 182, 183 & 184, High Holborn, London, W. C. 1. Sewing machine needles may be supplied by H. Ahlers & Berg G. m. b. H., Kiet, Germany and A. G. Mason, Mfg. Co., Cleveland, Ohio, U. S. A. For gunning factory materials enquire of Textile Machinery Stores Co., 61, Apollo Street East, Bombay. Soda water machine may be bought of Little & Co., 3, Grants Lane, Bowbazar, Calcutta.

2563. M. R. C. M., Bellary—Waterglass is sodium silicate. Process of manufacturing sodium silicate appeared in November 1924 issue. For other particulars write direct to the writer of the idea.

2565 T. R., Calcutt—Your query is intelligible.

2566 N. A., Vamayambadi—For pictureque calenders write to Maneklal Maganlal & Co., 7, 9, Cowasji Patel Street, Fort, Bombay. Rubber goods are imported by Geo. Beaver & Co., 92, Clive Street, Calcutta and M. M. Isphahani & Sons, 51, Ezra Street, Calcutta.

2569 D. L. D., Rawalpindi—For preparing hair oils you may go through the booklet Hair Oil Manufacture published by this office. Process of manufacturing anla oil will be found in March 1926, issue. Sarsoon oil cannot be deodorised. Recipes of vaseline pomade appeared in September 1924 issue. Kerosine oil may be made odourless by shaking it first with 200 grains of chlorinated lime for over 9 litres, adding a little hydrochloric acid, then transferring the liquid to a vessel containing lime and again until the chlorine is removed. After allowing the materials to subside the clear kerosine oil is decanted and stored away.

2571 B. G. C., Malvi—Derby lottery tickets are not sold to any one other than a member of the Royal Calcutta Turf Club, 12, Russell Street, Calcutta. For further particulars write to the Secretary of the Club.

2572 J. R. S., Madura—Magic snakes are composed of sulphocyanide of mercury, which may be bought of any chemist's shop. Mix the material to paste with water and roll it into balls without any other addition, drying them roughly. The stuff is highly poisonous as also the gas evolved on ignition. One must be careful in playing with them. For cardboard boxes enquire of H. L. Scott & Sons, 8, Nilmoney Mitter Street, Calcutta.

2573 M. M. B., Bombay—The quantity of soda crystal obtained will depend upon the purity of washing soda used.

2574 T. S. Qmlon—For small grinding machine enquire of T. F. Thomson & Co., 9, Esplanade East, Calcutta and Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

2575 P. V. M., Salsette—The machine supplier will teach sock making. Tablets may be made with the help of a tablet making machine. No special knowledge is required. For soap making you may go through some books on the subject to be had of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. You may also try to be an apprentice.

2577 F. C. K., Kunjah—Matches may be supplied by Adachi Y. N. Kasha, 13, Nishimachi, Kobe, and The British Trading Co., 15, Ginza Nichome, Yyobashiku, Tokyo, both of Japan. Toys may be supplied by Abe & Co., 61, Nichome, Naga-Machi, Yokohama and Amano & Co., 313, Nichome, Sannomyacho, Kobe, both of Japan. You may consult Kelly's Directory published by Kelly's Directory Ltd., 182, 183 & 184, High Holborn, London, W. C. 1.

2578 S. C., Sialkot—Seeds and plants may be had of Nurjhan Nursery, 2, Kankunachi 1st Lane, Calcutta.

2579 D. D. M. C., Simagar—The following is a list of newspapers and periodicals as required by you: (1) Penang Gazette and Straits Chronicle, Penang, Straits Settlements. (2) Straits Budget Singapore, Straits Settlements. (3) Evening Post, Wellington, New Zealand. (4) New Zealand Free Lance, Wellington, New Zealand. (5) Rand Daily Mail, Johannesburg, South Africa. (6) Natal Mercury, Durban, South Africa. (7) Overland

China Mail, Hongkong, China, (8) North China Herald, Shanghai, China and (9) American Exporter published by Johnston Export Publishing Co., 17, Battery Place, New York, U. S. A.

2580 N. I., Nani Tal—A good recipe of odourless liquid depilatory will be found in June 1924 issue. For printing text books you may write to Chakraverty Chatterjee & Co., Ltd., 15, College Square and Book Co., 44A, College Square, both of Calcutta. As regards class of required description consult an expert.

2582 B. H., Malda—Thank you for your valuable suggestion. For envelope making machines enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta. It will be profitable for you to buy a machine that will produce various sizes of envelopes (caustic soda should not be used in place of sulphuric acid). For glass phials and bottles enquire of Calcutta Glass & Silicate Works, Belgachia, Calcutta and Bengal Glass Works, 39, Canning Street, Calcutta. Cardboard boxes may be bought of H. L. Sett & Sons, 8, Nilmoney Mitter Street, Calcutta. For collapsible tubes and tin foils enquire of B. K. Paul & Co., 113, Bonfields Lane, Calcutta.

2583 D. K. D., Sursi—For small rice milling machines enquire of Indo German Trading Co., 11, Dalhousie Square, Calcutta. For other machines write your requirement to Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

2585 D. H. S., Karachi—Your queries are outside the scope of **Industry**.

2587 M. S., Amer—Premium bonds may be bought of Alex Brault & Co., 7/1, Wellesley Place, Calcutta.

2588 N. C. B., Lahore—Honey extracted from rose flowers is known as honey of roses.

Honey of roses is obtainable from honey combs in the vicinity of rose gardens. It has medicinal properties. Lotus honey is efficacious for all kinds of eye troubles. For family refrigerator enquire of T. E. Thomson & Co., 9, Esplanade East, Calcutta.

2590 R. N. S., Kamalia—Lubricating oil may be supplied by Don Watson & Co., 8, Lyons Lane; Vacuum Oil Co., 2, Clive Row and Valvoline Oil Co., B/2, Clive Bldgs., 8, Clive Street, all of Calcutta.

2591 P. D., Narsingpur—The machine supplier will give the necessary training required for driving oil engine and tractor.

2592 S. A. H., Jalalpur—Process for removing stains appeared in September and October 1926 issues.

2594 M. C., Coimbatore—An article on gold lace manufacture appeared in October 1926 issue of **Industry**.

2595 L. B., Latur—Picture frames may be supplied by Hem Chandra Chunder, 10 Swallow Lane and Fotie Lal Seal & Sons, 16, Swallow Lane, both of Calcutta. For cigarette enquire of Imperial Tobacco Co., Ltd., 5, Fairlie Place, Calcutta. Matches may be bought of H. Rashid & Co., 15, Zakaria Street and Lal Chand Brothers, Match Depot 33/A, Central Avenue; both of Calcutta. If you go through the Sale & Exchange pages of **Industry**, you will find addresses of many firms seeking agents. You may correspond with them for taking their agency.

2596 C. B. L. G., Indore—Cream separators may be bought of The Swedish Trading & Engineering Co., 13/3, Old Court House Street, and Indo German Trading Co., 11, Dalhousie Square, both of Calcutta. For particulars regarding dairy industry consult an expert.

2597 J. N. N., Dighat—An article on bone collection appeared in November 1924 issue. Can supply bone.

2598 S. D. S., Raigarh—For commercial books enquire of Kamala Book Depot Ltd., 15, College Square and Book Co., 44-A, College Square, both of Calcutta. For a list of prescribed books for mining examination write to the Principal, Mining Institute, Dhanbad, E. I. Rly.

TANTRIC RINGS ???

Kills diseases spreading germs, cures diseases soon. Bring Health, Wealth, Happiness and Success. Reduced price, set of 3, As 15. 6—Rs 1-8, Doz Rs 2-8, P.O. As 7.

SHANKER GIR KARYALAYA.

No. 2, Askunda, Muttra.



2599 N. R. R., Rohna—Fishing rods and hooks may be supplied by Carr Mohalanobis, Chowringhee; Mohuntosh Brothers, 15, College Square and S Roy & Co., 111, Esplanade East, all of Calcutta.

2602 V. D. C., Sholapur—Small ice plants may be had of Sulzer Brothers, 11, Clive Street, Calcutta. Brick making machines may be bought of Manollasmi & Co., Mangalore-Kankanady. Soap making implements may be supplied by Oriental Machinery Supply Agency, 20/1, Lall Bazar Street, Calcutta. Laundry machinery may be bought of Symington Cox & Co., Mercantile Bldgs., Lall Bazar, Calcutta. Motor cycles may be had of French Motor Car Co., Ltd., 234/3, Lower Circular Road; A. Milton & Co., Ltd., 156, Dharamtala Street, and Allenberry & Co., Ltd., 24, Park Street; all of Calcutta.

2603 K. S. Jeypore—For refining and clarifying mowha oil you may consult Vegetable Oil & Fats by Louis F. Andes to be had of Chackraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. On depositing money you may issue out books on loan from Commercial Library, 1, Council House Street, Calcutta and read them. For soap and candle mould write to Dutt Engineering Works, 42, Munaripukm Road, Manicktola, Calcutta.

2604 T. K. J. R., Tanjore—Your enquiry is outside our scope.

2605 B. H. S., Gaidwal—The following is a list of correspondence institutes of U. S. A.: International Correspondence School of Scranton, Scranton; Alexander Hamilton Institute of New York, and University of Kansas, Kansas. Medical instruments may be bought of B. K. Paul & Co., 113, Bonfields Lane, Calcutta. Homeopathic institute of England and America are The London Homoeopathic Hospital, Great Ormond Street, Bloomsbury, London, W. C. 1. The British Homoeopathic Association, Clarendon House, Russell Square, London, W. C. 1. American Institute of Homeopathy, 829, Marshall Field Bldg., Chicago, U. S. A. And the Hahnemann Medical College and Hahnemann Hospital of

Chicago, 2811-2817 Cottage Grove Avenue, Chicago, U. S. A.

2606 A. K. D., Srimangal—Formulas of various kinds of soap appeared in the last volume of **Industry**. As regards tobacco manufacture go through Indian Tobacco & Its Preparation published by this office.

2607 A. N. B., Quetta—Manufacturing socks is a profitable industry but management should be under an expert supervisor. Needles and yarns you require may be bought of E. B. Bros. & Co., 11, Dharamtala Street, Calcutta. Start the industry in the vicinity of a big town so that all the product is consumed locally. Otherwise you have to advertise and to incur other additional expenses for the disposal of your product.

2609 H. A. R. G. M., Muttupalayam—Banshidhar Dutt & Sons, 126, Khengraputty, Bara Bazar and Madhab Chandra Daw, 4, Armenian Street, both of Calcutta deal in cardamom, pepper, etc. Tea may be bought of Mukherjee Bros., 17/19, Shambazar Bridge Road, Calcutta. Wants to be put in touch with dealers in coffee, potato and rice.

2610 P. L. B., Sahowala—The agent of Pfaff sewing machine is Ram Naram & Sons, Kanaha, Punjab. Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta will serve your purpose, as all the addresses you require will be found in that

SAMPLE ON REQUEST



Rs. 2/- Per Dozen.
Sole Agent:—
R. MITTRA & CO.,
KRISHNAGAR, BENGAL.

directory Premium bonds may be bought of Alex Brault, 7/1, Wellesley Place, Calcutta. We cannot advise you on the subject, use your own discretion. Yes, you may start shoe lace manufacturing business. It has good prospect. As regards cinematographer's business you may secure order for advertisement, film but you have to advertise widely for the purpose. Monthly expenses for a student in Germany will be from Rs. 250 to Rs. 300. For further information write to Student's Information Bureau, 617, Kasbapeth, Poona City.

2611 L M U T C, Calcutta—Vegetable product is imported by E. D. Sasoon & Co., 100, Clive Street; Ralli Bros. & Co., 1 & 2, Church Lane, Graham & Co., 9, Clive Street and Andrew Yule & Co., 8, Clive Row, all of Calcutta. Gold and silver thread may be supplied by Kollani & Co., W. Kronenstrasse 50, Berlin; Engel & Kubiig, Rutterstrasse 71 Berlin, S. W.; F. Voelcker, Spitalerstrasse 10, Hamburg and P. Haessler, Burgsch-midstrasse 20, Nurnberg; all of Germany.

2613 J. N. R., Dacca—You may learn leather tanning at Calcutta Research Tannery, Pagladanga, Entally, Calcutta. There is no school known for learning boot and shoe making. For securing service in Wireless Telegraph department write to the Director General of Post and Telegraph, Delhi.

2614 M. C. B., Dacca—There is no school for learning photography, it is a self-taught science. If you go through some manuals on the subject you will get much information.

2616 B. I. I. S., Ambala—There is no book dealing with the manufacture of plaster of Paris and its various uses appeared in May 1924 issue. In the beginning you may engage an expert. We put a notice in the Trade Enquiry

Columns to this effect. As regards remuneration you should correspond with the respondents privately. For selling it to the Government you may write to the Superintendent Government Stores Department, Delhi.

2619 B. F., Nagpur.—Process of manufacturing caustic soda will be found in May 1924 issue and a formula of washing soda appeared in July 1924 issue.

2620 D. H. S., Karwi—The simplest method of ascertaining adulteration and purifying the ghee at the same time is to reboil a given quantity and when it is in a state of complete ebullition to dash cold water on it. The oil if any, will rise to the surface and part from its mixture.

2621 L. C. G., Morar—For the book required you may enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2622 K. P. B., Agra—Flouric acid may be bought of B. K. Paul & Co., 1/3, Bonfields Lane, Calcutta. Emery powder may be had of Kailash Ch. Dutt, 20, Bonfields Lane, Calcutta.

2624 P. A. S., Masulipatam—Fancy goods may be supplied by G. Brehmer Markenkuchen 18, Germany. Precious stones may be supplied by Hardy Brothers Ltd., 13, Hunter Street; W. G. Jina, 132, Pitt Street and H. L. Lewis, 15, Hunter Street; all of Sydney, Australia.

2625 B. S., Khandwa—There is no such school known to us.

2626 K. D., Kumud—German embroidery machines may be bought of H. S. Khosla & Co., Outside Shahalmi Gate, Lahore. Wants to be put in touch with orange dealers of Nagpur.

2627 R. G. H., Poona City—In your previous letter you enquired about patent registration in England. As regards Query No. 1811 it has already been replied by post.

2628 B. S. J., Uthamapalayam.—Wants to be put in touch with cardamom dealers of different places.

2629 S. A. K., Secunderabad.—For harmoniums enquire of T. E. Bevan & Co., Ltd., Old Court House Street; Dwarika & Son, Dalhousie Square; K. C. Dey & Sons, Lower Chitpur Road; Calcutta Musical Mart, Lower

THE SECRET OF SOAP MAKING

It will teach you how to prepare at home coloured and scented Toilet Soap, Glycerine Soaps, Soaps like 'Sunlight Soap, Washing, Laundry and other useful soaps with the least trouble and expense. The author is a manufacturer for years and with success. Price Rs. 2 only. V. P. charges extra.

THE HINDUSTAN SOAP WORKS,
Publishing Depot. No. 1,
P. O. Nowasahar, Jullundur.

Chitpur Road; Miller & Co., Lower Chitpur Road; Mohin Bros., Lower Chitpur Road; Sarat Ghose & Co., 3, Esplanade Mansion and Biswas & Sons, Lower Chitpur Road; all of Calcutta

2633. L. R., Muzaffarnagar.—Chloroform ether is a chemical obtainable from a chemist's shop. You may try B K Paul & Co, 113, Bonfields Lane, Calcutta.

2634 T R, Vadakangulam.—It will be advisable for you to put an advertisement in Sale & Exchange pages of **Industry** to secure agents Can supply herbs and roots used in Ayurvedic and Unani medicine

2635. H K. C. W., Sholapur—Your query is unintelligible

2636 B N, Gohana.—Hydrometers may be bought of Scientific Instrument Co, Ltd, Johnstonganj, Allahabad

2640 G E S C, Mapuca.—You may advertise in the pages of **Industry** for securing buyers for paper toys

2641 C. S. C., Nattarampalli.—For iridium fountain pens enquire of Nilmoney Halder & Co, 106, Radhabazar Street, Calcutta. Process of depositing iridium at the end of a fountain pen nib appeared in September 1922 issue

2642 E. T. C., Bhandaria.—We are ready to supply any kind of information required by our constituents

2643 A. N. D., Balasore.—Banian making machines may be supplied by W H Brady & Co, 26, Strand Road, Calcutta For second-hand machines write to Biswakarma Agency, 84A, Chive Street, Calcutta Corrugated iron sheets may be bought of Anandji Haridas, 20, Dharamtola Street, Calcutta Oil engines may be supplied by Healy Gresham, British Indian Street, Calcutta Iron safes may be bought of Dass & Co., Lock Gate, Cossipur, Calcutta

2644. B. J. D., Benares City.—For securing loans correspond with Bengal Central Loan Co. Ltd., 2, Lall Bazar Street and Mahajan Banking & Trailing Co., Ltd, 7B, Chive Row; both of Calcutta.

2645. R. T. C., Bellary.—Envelope making and ruling machines may be bought of Ashutosh Addy & Co., 16, Lower Chitpur Road, Calcutta.

2647. M. C., Peshawar.—Tallow may be bought of Calcutta Tallow Mart, 19, Tiretta Bazar Street, Calcutta. Tripoli, etc. may be bought of Kailash Ch Dutt, 20 Bonfields Lane, Calcutta

2648. B. L., Almora.—For confectionery and chocolates, enquire of S. M. De Souza & Co, Bakehouse Lane, C. Fanel & Co., Parel Road, Byculla and Edward Bakery, Mint Road, Fort; all of Bombay Tracing papers may be bought of Chandra Mohan Sur & Co, Swallow Lane, Calcutta Electric dry batteries may be supplied by Calcutta Store, 71, Tagore Castle Street, Calcutta

2649 M K N, Pollachi.—You may use Thacker's Indian Directory to be had of Thacker Spink & Co, 3, Esplanade East, Calcutta

2650 R. D. V., Chhundwara.—Envelope making machines may be supplied by Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta

2651 R B S, Lahore.—Your queries are not in our line

2652 C C G, Jannagar.—Cigarette paper may be supplied by L Kehlmann & Co, 229, West 28th Street, New York, U. S. A and The French Cigarette Paper Company Ltd, 49A, Rectory Grove, Clapham, London, S W An article on cigarette manufacture appeared in 11th volume of **Industry**.

2653 M B, Jaipur.—Process of preparing face cream will be found in July 1924 issue

ALWAYS MIND ECONOMY. AN HOUR'S WORK IN A FEW MINUTES

This is a Wonderful Automatic Hand Machine, for quick, Smooth, Invisible **WEAVING** in any fabric. Saves endless time and trouble. Repairs any size hole in Stockings, Underwear, Coats, Pants, Sarcos, Dhobies etc. Silken, Woolen, or Cotton. Quite simple a child can use it. Sent with illustrated directions. **Price Rs. 1-14-0. Post Free V. P. P.**



THE NOVELTY MART,
BOMBAY No 3

No Home should be without One.
Nearly 5000 Already In Use.

Hindi equivalent of 'chua' is not known. It may be bought of Jadu Nath Ghar, Hukkaputty, Bara Bazar, Calcutta.

2654 G. G. B., Kurunegala.—An article on candle manufacture appeared in November 1926 issue. Pearl button is manufactured in a machine specially manufactured for this purpose.

2655 A. M., Bellary.—Wants to be put in touch with dealers in Rastganolu or Pensramaballs in Calcutta.

2656 S. A. G., Bombay.—Copper hydrate may be bought of Bengal Chemical & Pharmaceutical Works, 15, College Square, Calcutta and C. C. Biswas, 125, Bow Bazar Street, Calcutta.

2657 S. I. M. E., Madras.—For ply wood you may enquire of Packing Case & Timber Co., 31, Linton Street, Entally and Packing Material Co., Upper Circular Road, both of Calcutta.

2658 C. L. B., Ferozepore.—Your enquiry is not in our line.

2659 K. S., Bundala.—An article on wool dyeing appeared in January 1925 issue which you may consult with benefit.

2660 N. R. P., Sursi.—For betelnut cutting machines enquire of Medland Bosc & Co., 13/1, Old Court House Street, Calcutta.

2661 P. C. B., Meerut.—The London firm with whom you wish to establish business connection wants your business reference so that he may be satisfied with your respectability.

2662 H. H. D., Bishanpura.—Cycles and accessories may be supplied by Berk & Martens, Gansemarkt, 53/55, Hamburg, Germany; H. Ahlers & Berg, G. m. b. H., Kiel, Germany; Hermann Beier & Co., Karlstrasse 24, Karlsruhe, Germany; B. S. A. Cycles Ltd., 2, Gresham Bldgs, London, W. C. 2. Miami Cycle & Mfg. Co., Middle Town, Ohio, U. S. A. and Hindee Mfg. Co., Springfield, Massachusetts, U. S. A. Recipes of Zarda will be found in November 1924 issue. A good formula of washing soap will be found in January 1926 issue.

2663 K. S., Rewa.—You may use a water pump that may be supplied by K. B. Joshi & Co., 321, Hornby Road, Fort, Bombay.

2664 H. C. C. C., Surat.—For platinum wire enquire of Scientific Supplies Co., 29-31,

College Street Market, Calcutta and Scientific Instrument Supply Co., Ltd., Johnstonganj, Allahabad.

2665 D. H. S., Kaiwi.—Refer your enquiry to the Director of Industries of your province. Can supply tiskut or stalks of linseed.

2666 D. P. G., Anjar.—For manufacturing various kinds of silicates a sound knowledge of chemistry is required. So it is advisable for you to go through a manual on chemistry.

2667 K. S. J., Panchmahar.—We are not aware of particulars of Dr. B. Dey.

2668 S. S. T., Fatchgarh.—Razor blades may be sharpened. Recipes of black varnish will be found elsewhere in this issue. Process of manufacturing rose water will be found in April 1925 issue. Recipes of other toilet articles will be found in September 1924 issue. Vanishing cream is used for toilet purpose. Worcester sauce is used with bread.

2669 R. D., Sukkur.—Reply to your queries appeared in October issue under No. 1940.

2670 G. V. M., Poona.—For books on electroplating enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta. Prospects depend mainly upon demands of articles. You may invest Rs. 3000 in the beginning and supplement it when necessary.

2671 C. R. N., Madras.—Plantain fibre has no overseas demand now. You may however correspond with Austin & Hayes, Muswell Hill Road, High Gate, London, No. 6 and B. F. A. Fibre & Industrial Co., Ltd., 17, Waterpool Place, London, S. W. 1, whether they are willing to take plantain fibre from you.

2672 S. A. P., Ambasamudram.—For books on soap manufacture write to Chakraverty Chatterjee & Co., Ltd., 15, College Square, and Thacker Spink & Co., 3, Esplanade East, both of Calcutta.

2673 M. P., Agra.—Parts of a camera and photo goods may be supplied by Calcutta Camera House, Chowringhee and Photographic Stores & Agency Co., 154, Dharamtola Street, both of Calcutta. For books on tailoring write to East Bengal Society, 1, Mirzapur Street, Calcutta.

NOTICES AND REVIEWS.

Razor Blades.

It is understood that Messrs R. Mediratta & Co., of Lahore hold a large stock of cheap razor blades of a popular brand. Our readers may give them a trial.

Rubber Stamp.

Messrs Singhai Mojilal & Sons, are well known rubber stamp makers and engravers of Jubbulpore. They have sent us two rubber stamps, one phial of ink and one ink pad to be included in our office stationery. We have found these very serviceable.

A Progressive Shoe Store.

We have visited the shoe store of Messrs Roy and Roy, 1, Cornwallis Street, Calcutta, conducted by educated Indian youths who are experts in tanning. The firm can supply a wide range of shoes which are hard to match in respect of size, shape, finish, fitness or durability. The quality is good and the price moderate. They also undertake taxidermy.

An Exchange Club.

As will appear from an advertisement appearing elsewhere, the Asian Exchange Club, is an association of amateurs for exchanging postage stamps, post card views, curios, photos, etc. We understand that the club is unique of its kind in India and its clientele extends over the whole country. For further particulars our readers should write to the Proprietor, Post Box No. 357, Bombay.

Mysterious Ink.

We have received a sample phial of mysterious ink made by The German Agency, Kalla Street, Trichinopoly. It may be used in conducting secret correspondence, entertaining children and the like.

A Booklet on Magic.

Chemical Magic by Mr. A. L. Mukherjee. Publishers—Messrs B. N. Mukherjee & Bros., Andherdeo, Jubbulpore.

In this small book is to be found a large and varied collection of magic and tricks which can be easily performed with the assistance of simple chemicals.

A Book on Novelties

Novelties and How to Make Them. Published by the Experimental Publishing Co., of America. To be had of the local agents Messrs Ramsankar & Co., Kottar, Travancore.

With the help of this book one can easily learn to make hundreds of remarkable things at home. It shows how to convert otherwise waste materials into useful products. For example a bookshelf can be made from empty spools; artificial flower from waste paper; toys from match boxes, tools from watch springs; and the like. The hints are lucid and clear, and copiously illustrated.

All-India Poultry Show.

The All-India Poultry Show held in the Eden Gardens, Calcutta towards the middle of December was an unqualified success. There were over 500 entries comprising fine indigenous fowls and admirable imported birds e.g., Deshi breed, Chittagong, Rhode Island, Red and White Leghorn, and the like. As is natural some ducks, turkeys, pigeons, etc. were also included.

ESSENCES, AND ESSENTIAL OILS

Perfumes, Chemicals and Sundries, etc.

Everything you need for Manufacturing, Hair Oils, Scents, Ottos, Soaps, Perfumed Waters, Syrups, Udbathis (Scented-Sticks) Zarda Tobacco, Snuffs, Pomades, Hair-Lotions and Perfumery preparations in general; can be had of us at very competent rates. Price list free. Apply to—D. G. GORE,

31, Mangaldas Road, Market, Bombay No. 2.

Poultry keeping appliances, poultry feeds, etc formed the next big item in the exhibition. The propaganda film picturing poultry life in an up-to-date farm was impressive and instructive. These shows will certainly help to popularise poultry keeping in the country, where the vast possibilities of poultry products do not seem to have fully realised.

A poultry conference also met in this connection; papers were read on such useful subjects as breeding and diseases of poultry and resolutions were passed for promoting poultry industry in India by all possible means. Those interested in this industry may communicate with the organiser Mrs A W Fawkes, Secretary, United Provinces Poultry Association, Lucknow, whose untiring energy and devotion are really commendable.

A Correction.

The address of Mr B S Ganeswaran dealer in cardamom minor is Pannapuram, Uthamapalayam P O, Madura

Trade Enquiries.

[To communicate with any party write him direct with name and address given below, mentioning **Industry**.]

2615 Suryaman Baidya, 19, Swathatola Patun, Nepal—Wants to be put in touch with gentlemen who gather mass of Naga character.

2616. The British India Industrial Syndicate, Swamin Street, Ambala City—Want an expert in manufacturing plaster of Paris.

2631 A Sher & Co, Qamar Khan Street, Jullundur City—Want to be introduced to Indian exporters of hair, horns and feather.

2632 Installation Manager, Burma Oil Co Ltd, Tondiarpet Installation, Madras—Desires to be put in touch with dealers in Kieselguhr.

2646 Pulin Chandra Gogoi, 97, Mechua Bazar Street, Calcutta—Wishes to be introduced to dealers in elephants' tusk.

2681. K N Kamath, Old Gokern Matt, Mangalore—Desires to be put in touch with dealers in raw ginger, barley, wheat, flour, yams, beeswax, honey, ghee, etc.

2682 Ashutosh Das Gupta, Hatiya, Noakhali—Wants a secondhand soap stamping machine.

2683 L Basack & Co., 5, Old Court House, Corner, Calcutta—Wants to be put in touch with collectors of lizard-skins, white fox skins, python skins, linseed, cotton seed, groundnut and kapok for shipping purpose.

2734 Kshitish Das Gupta, Chandrarah, Barisal—Wants a capitalist with Rs 1,000/- to finance a gaslight works.

2768 M Mohammad Siddiq & Sons, New Cantonment, Delhi—Desire to be put in touch with suppliers of detective equipments such as membranes, oils, caps, wigs, etc.

2782 Mela Ram Dutt, Railway Road, Sialkot City—Wants to be put in touch with suppliers of monkey skin, rat skins, wild cat skins, mongoose skins, snake skins, lion and tiger skins and Persian carpets.

2785 M A Venkatachari, 153, Big Manager Street, Chingleput—Can supply betels in very large quantities.

2789 Shiba Prasad Sarkar, Civil Court, Chabassa—Wants to be put in touch with dealers in mowha oil, neem, karanj and mustard kusu.

JANUARY ISSUE OF INDUSTRY

(In the Press.)

The January issue of *Industry* which will appear on the last day of the month will contain many interesting articles besides the regular features such as Formulas and Processes, Small Trades and Recipes, etc. Any friend of our Subscribers may get a copy free as sample on application to the Manager, *Industry*, Shambazar, Calcutta.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows:—

Indian Rs 3/-, Foreign Rs 5/4/-.

The charge is for complete yearly volume only, inclusive of postage. V. P. and Registration fees are separately charged.

BUSINESS NOTICE:

Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

Manager *INDUSTRY* OFFICE,
Shambazar, Calcutta.

IF YOU WISH TO IMPROVE YOUR ENGLISH

DO AS I ASK YOU TO DO:

Take your pen Cut out a sheet from your writing pad Write on it your full name and address If you are living in a village, be sure you add the district as well If you have in view any Commercial or University Examination, mention it Give me some idea of what you are and what you wish to be Omit nothing that may be of help to me in planning a special course to meet your needs Address the envelope thus

To, The Director,

THE SCHOOL OF ENGLISH,

Department 12.

POST BOX NO. 20, G. P. O. POONA

Pickles, Chutneys and Morabbas.

Luscious lovely names Yes! You can manufacture them at your home and carry a roaring sale in the market Elaborate process and well tried formulas given by an expert in simple English in

**Manufacture of
INDIAN PICKLES, CHUTNEYS
AND MORABBAS.**

Rs. 18 a Copy A P P extra
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KESHUB BHABAN,
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Ingredients of Writing Inks	Autographic Ink
Recipes	Drawing Ink
Blue-black, Black	Indian Ink
Red, Violet, Blue	Luminous Ink
Green, Green	Ink for Glass, for
Chrome, Yellow,	Leather, Marking
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**By Manufacturing Ink Small Capital
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**The Art of Manufacturing this
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**This is the latest of the Industry
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**With tried recipes and practical hints
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explained and the secrets fully ex-
posed in a way understandable and
workable without any chemical
training.**

**By a Specialist of 40 years'
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Price Re. 1-8-0.

Industry Book Dept., Shambazar, Calcutta.

THE CURES OF UNEMPLOYMENT.

Mr. M. Viswanadham of Madras writes under date 3rd December, 1926. "Having taken the V. P. containing the two books (1) Money Making by Mail and (2) Mercantile & Mail Order Letters & Methods, I have gone through the same three times thoroughly,.....and must admit I am benefited by them to a considerable extent and I sincerely trust that many a young man who complain of unemployment, will do well not to miss these two gems."

Mercantile & Mail Order Letters and Methods.

SUMMARY OF CONTENTS

Requirements of a Modern Letter.
Scope of a letter
Technicalities of a letter
General Form
Building up of the letter
The Subject matter
The Arrangement
Characteristic of a modern letter
General Classification
Form of Routine Letters
Enquiry Letters and Answers
Complaint Letters & Adjustment
Mail Order Salesmanship
Suitable Business
Publicity
Advertising in the Press
Advertising by Post
The Mailing List
The Catalogue
Procuring Orders
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Organisation of Agents
The Follow up
Letters to Dealers
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Letters to Dealers
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Collection Agent,
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And 50 Model Letters

Rs. 3.

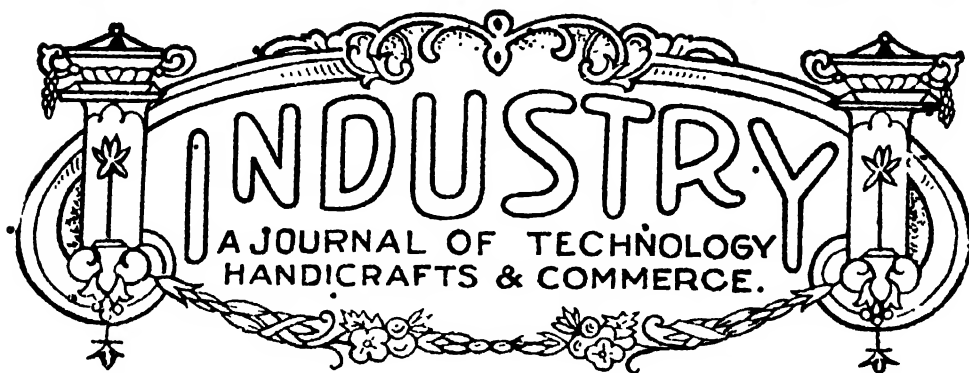
Money Making By Mail

SUMMARY OF CONTENTS.

Chances & Opportunities
Commence with any Capital
Mail Order Advertising
Concrete Instances
Effective Headline
Direct Sales Advertisements
Wordings of Advertisements
Power of Optimism
Regularity and Space
The Catalogue
An Elaborate Brochure
Instructions on Ordering
Procuring Testimonials
Mail Order Follow-ups
Study the Purchasing Mind
Some Selling Ideas
The Risk & Safeguard
Mail Order Possibilities
Fixing Selling Price
Prospective Customers
The Mailing List
The Best Foundation for a
Mailing List
Making Business Cumulative
Mail Order Practices
Classes of Buyers
Where to Start
Classification of Opportunities
The Most Feasible Field.
Practical Propositions
Mail Order Techniques,
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THESE BOOKS ARE SOLD ON MONEY BACK GUARANTEE.
Industry Book Dept.
KESHUB BHABAN.
SHAMBAZAR, CALCUTTA.



INDUSTRY OFFICE:—Keshub Bhaban, Shambazar, Calcutta.

ONCE MORE A NEW YEAR ARRIVES AND WITH IT A
YEAR OF OPPORTUNITY KNOCKS AT YOUR DOOR.

ONE MORE VOLUME OF

INDUSTRY

IS COMING TO CLOSE. IT
WILL COMMENCE THE
EIGHTEENTH VOLUME IN
APRIL NEXT.

We hope you read every issue of the seventeenth volume regularly. if at any time it has afforded you a little information, may be a wink of light in the dark days of depression that we were passing, may be a respite in the troublesome time of no employment, no earning, we feel we have done something worth doing. But that is not our only mission.

WE WANT YOU TO KNOW

AND LET YOUR FRIENDS KNOW

That here is a friend to whom anyone can turn not only to know the way to Prosperity, but also for the way of safety in times of

PROSPERITY AS ALSO ADVERSITY.

ANNUAL SUBSCRIPTION Rs. 3-/-

SINGLE COPY As. -5/-.

NOT ONCE, NOR TWICE.

What a part has **INDUSTRY** played in the story of Indian Business Success! Not once, Nor twice, but many times year after year Businessmen testified how they had overcome slump in the market and even loss and found way to success through the advertising pages of **Industry**. It thrills us to hear these stories of business success. They will thrill you also. Below we give only a few:—

Mr D K Sathe, 83, Bindhawanpeth, Poona, writes on 28-1-27 "I have given my advertisement in your Magazine only two times and I found your Magazine more effective than other papers."

Mr. P. R. J. Naidu, Ongole, writes on 24-1-27 "I am advertising in **Industry** for many years, and I have a great desire to continue the advertisement. Those who wish profit should advertise in **INDUSTRY**."

The Continental Textile Stores Co., P. O. Box 770, Bombay writes on 22-1-27

"Looked to the services that are being rendered by your magazine (**Industry**) we admit it surpasses all other magazines in the whole of India."

Knowledge Office, 21, Woodroffe Mansions, Calcutta writes on 21-1-27 "I am pleased to say advertising in **Industry** has been very beneficial to me as I have received enquiries from all parts of India and also Africa."

South India Supply Agency, Madras, writes on 15-1-27 "The first advertisement besides paying for itself has brought about many enquiries, and still brings many more."

Dr. T. N. Sharma Kaviratna, Guwat, Punjab, writes on 29-1-27 "I am satisfied for the last two years for my advertisement in **INDUSTRY**. Certainly there are very few magazine in India which can give such results."

Mr A P Kodaisia, B.Sc., I. R. S. (London), Chief Forest Officer, Bausda State writes on 28-1-27 "Among the Commercial papers of the day in India, I am of opinion that **INDUSTRY** heads the list. It is a real friend of tradesmen. I often give my advertisement in it and the result I always find most effective."

Messrs Alladin & Sons, Alladin Buildmcs, Oxford Street, Secunderabad, write on 31-1-27 "I have the pleasure to state that my advertisement in your magazine proved more effective in comparisons, than my advertisement elsewhere."

Messrs Rukmas & Co., Post Box 90, Lahore, write on 28-1-27 "I placed a very small advertisement in **Industry**, but I received orders to the value of about Rs. 600 from all parts of the country."

INDUSTRY

1. Every issue of the Magazine is keenly awaited by thousands of readers all over the country.

2. Every issue is being read and re-read by increasing volume of buying people and turned from hand to hand throughout the month.

3. Every new advertiser is discovering the immense value of its advertising pages.

4. Every old advertiser is repeating his advertisement at stated intervals.

IT PAYS TO DO SO

Rates

ORDINARY POSITION

Full Page	Rs. 40/-
Half Page	Rs. 22/-
Quarter Page	Rs. 12/-
One Inch	Rs. 3/4

Advt. Manager,

INDUSTRY

Keshub Bhamban
SHAMBAZAR, CALCUTTA



VOL. XVII.

CALCUTTA, JANUARY, 1927.

NO. 202.

INDUSTRY AND SPECIALISATION.

OF the many elements on which industrial development depends, the question of specialisation looms large. Under this general term are included all plans and methods of work by which the scope of activity of man is concentrated.

The highest degree of skill of artist or worker is attained by concentration of energies to a restricted range of work. It is through practice that the skill is acquired. The highest skill and highest ability is attained by the degree of interested attention and number of repetitions of a given kind of work.

Other things being equal, the practice, combined with keenness of interest, makes the most successful man in a given profession or work. Repetition of operation becomes an automatic action in which man accomplishes the most work for a given expenditure of energy.

To know something thoroughly and completely is to know a great deal, and such definite knowledge can be applied in many directions. To know a little about many things is to lack the power of knowledge, for the power of knowledge is in its application to the practical ends of life. Advance comes by special con-

centration on the subject until all that can be known about it is known, and the general rate of advance depends upon the amount and thoroughness of the specialisation devoted to each of the units comprising the whole. While it is true to say that each industry hangs upon specialised knowledge particular to itself, it would be wrong to say that its progress rests upon this knowledge only. The ability of an industry to hold its own depends upon many factors. It depends upon the volume of its production and the cheapness of that production. These in turn will depend upon the complete and efficient utilisation of all that the product of that industry contains and the elimination of all wastes in the production of the commodity and if there should be waste or by-products produced as the result of the production of the main product, then in the utilisation to the fullest extent possible of all such waste or by-products. Thus the efficiency of any one industry depends upon the application of expert knowledge reaching it through different channels and that knowledge has to be correlated in practical effort to secure the best results.

DYEING OF MIXED FABRICS.

THE coloration of textile fabrics composed of more than one kind of material generally requires two or more processes, as the plan pursued in dyeing wool is seldom capable of fixing the colour upon cotton. The customary plan followed is to immerse the fabric in the requisite baths to dye the wool and then to treat the partially dyeing material in the manner found suitable for cotton. Occasionally the woolen thread of the cloth is dyed of one colour, and thereafter the cotton is treated so as to acquire a different shade or colour, with the coal tar colours, mixed fabrics can be dyed in one bath, thus saving much time. The dyer is now able to produce, by combination of the different colours, a great variety of rich shades on mixed fabrics by first dyeing the wool with an acid dye, then cooling down his bath and adding his cotton dye, and dyeing the cotton another shade from what was produced on the wool. In dyeing silk, care has to be taken to free the silk from all gums, and this is done by boiling off in a soap bath. Most of the dyeing is done direct and under the boil.

In communicating the deep indigo blue to woolen cloth and yarn a vat is taken about six or seven feet in diameter, and eight to nine feet in depth, and nearly filled with water, along with from 18 to 22 pounds of indigo, finely ground in water, 10 to 20 pounds of madder, 7 to 9 pounds of bran, and 9 pounds of woad. After the requisite boiling, and the addition of seven or eight pounds lime to form an alkaline liquid, to which the indigo can be held in solution, the

whole is well closed over the tightly fitting wooden covers. Within 24 hours the petrid fermentation of the woad and iron proceeds, the result of which is to abstract the oxygen from the blue indigo, the colour of which is greatly reduced, until it assumes a yellowish colour, and the solution then contains indigo white. If woolen cloth or yarn, is now dipped in this liquid, it comes out of a yellow tint from the attachment of the white indigo solution. But when exposed to the air, the oxygen immediately begins to act on the white indigo, combining with it so as to form oxidized or blue indigo, and as the process of oxidation proceeds the yarn or cloth becomes first of a greenish and then of a blue colour. If the cloth be again soaked in the yellowish solution and subsequently exposed to the air, the depth of the blue colour may be increased, step by step till it arrives at that deep shade of blue so well known.

In the dyeing of cotton with indigo the vat is prepared differently. The indigo is first ground into a thin paste with water, and afterwards placed in a vat with protosulphate of iron and milk of lime. The lime takes the sulphuric acid from the sulphate of iron forming sulphate of lime, and liberating protoxide of iron, which immediately abstracts the oxygen from the blue indigo, reducing it to white indigo and the latter dissolves in the excess of lime present in the vat almost colourless, but on exposure to the air, the indigo becomes re-oxidised and the cloth passes to a green and ultimately to a deep blue shade. The cloth or yarn is then washed in water and afterward soaked in a very dilute sulphuric acid to

remove any oxide of iron remaining attached and rewashed in water, when the blue colour becomes more bright and clear. Fast fulling colours dyed either in the wool yarns or pieces, are usually dyed with the alizarin colours on account of their being fast to fulling and light. These are usually mordanted with bichromate of potash and cream tartar for one and a half hours at a boil. Then they are thoroughly rinsed in cold water and finished in another bath with the alizarine colours. Owing to the great affinity existing between the alizarine colours and the mordanted wool, great care has to be taken to enter the bath at a low temperature and very gradually bring to the boil to insure the goods being dyed even. Extra care must be taken that only the amount of the alizarine necessary is added to produce the shade. Cotton is now largely dyed direct. Formerly dyers were obliged to give a number of baths and even then were not able in a great many cases, to secure the brilliant shades that are now dyed in one operation. The colour simply being fixed in the pores of the cotton, it is difficult to secure a fast colour on this fibre than on wool. As in the case of wool, dyeing machines are now manufactured by which the cotton is dyed both in the raw state, yarns, and pieces, which economizes in the labour and enable the dyer to produce better results both as to shade and fastness. In recent years, there has been a large addition to the artificial dye-stuffs thus giving cotton dyers a much better opportunity to produce brighter and faster colours. Some of these are dyed

direct, thus making a great saving of labour, besides some are very fast both to light and washing.

The yarns for carpets are dyed almost exclusively with the coaltar dyes. This is done mostly in the yarn, and are dyed direct by entering them in the dye bath, which has previously had added the colour, with the proper proportion of sulphuric acid and glauber salt and gradually brought to the boil, being turned by hand. The bath is generally exhausted in about three quarters of an hour. The yarns furnished to the dyer are frequently of a mixed material which is dark in colour and in this case he must choose the very brightest of dyes to give the required brightness of shade. For the finer grades of carpets, the colour must thoroughly penetrate and in matching shades the dyer usually cuts his yarn and matches from the centre.

PIN MAKING AS HOME INDUSTRY.

THE first thing to be done in the manufacture of pins by the hand method is to reduce a quantity of brass wire to the requisite size. This is generally done in the pin factory, as the wire is received of larger diameter than necessary. It is performed in the usual manner of wire drawing; and the wire is then made up into coils of six inches diameter, and any dirt or crust which may be attached to the surface is got rid of by first soaking the coils in a diluted solution of sulphuric acid and water, and then beating them on stones. The next process is to straighten the wire; after which it is cut into pieces

each about long enough for six pins. These latter pieces are then pointed at each end, in the following manner. The workman sits in front of a small machine, which has two steel wheels or mills turning rapidly; of which the rims are cut somewhat after the manner of a file, one coarse, for the rough formation of the points, and other fine for finishing them. Several of these pieces are taken in the hand, and by a dexterous movement of the thumb and forefinger are kept continually presenting a different face to the mill against which they are pressed. The points are then finished off by being applied in the same manner to the fine mill. After both ends of the pieces have been pointed, one pin's length is cut off from each end, when they are re-pointed, and so on until each length is converted into six pointed pieces. The stems of the pins are then complete. The next step is to form the head, which is effected by a piece of wire called the mould, the same size as that used for the stems, being attached to a small axis or lathe. At the end of the wire nearest the axis is a hole, in which is placed the end of a smaller wire, which is to form the heading. While the mould wire is turned round by one hand, the head wire is guided by the other, until it is wound in a spiral coil along the entire length of the former. It is then cut off close to the hole where it was commenced and the coil taken off the mould. When a quantity of these coils are prepared, a workman takes a dozen or more of them at a time in his left hand, while with a pair of shears in his right he cuts them up into pieces of two coils each. The heads, when cut off, are annealed by being made hot and then thrown into water. When

annealed, they are ready to be fixed on the stems. In order to do this, the operator is provided with a small stake, upon which is fixed a steel die, containing a hollow, the exact shape of half the head. Above this die, and attached to a lever, is the corresponding die for the other half head, which, when at rest remains suspended about two inches above the lower one. The workman takes one of the stems between his fingers, and dipping the pointed end into a bowl containing a number of the heads, catches one upon it and slides it to the other end; he then places it in the lower die, and moving a treadle brings down the upper one four or five times upon the head, which fastens it upon the stem, and also gives it the required figure. There is a small channel leading from the outside to the centre of the dies, to allow room for the stem. The pins are now finished as regards shape, and it only remains to tin or whiten them. A quantity of them are boiled in a pickle, either a solution of sulphuric acid or tartar, to remove any dirt or grease, and also to produce a slight roughness upon their surfaces, which facilitates the adhesion of the tin. After being boiled for half an hour, they are washed and then placed in a copper vessel with a quantity of grain tin and a solution of tartar, in about two hours and a half they are taken out, and after being separated from the undissolved tin by sifting are again washed; they are then dried by being well shaken in a bag with a quantity of bran, which is afterwards separated by shaking them up and down in open wooden trays, when the bran flies off and leaves the pins perfectly dry and clean. The pins are then papered for sale.

WROUGHT AND CAST IRON PIPES.

BOTH cast and wrought iron is extensively used in the manufacture of pipes; the former kind, is, however, the more frequently employed, as water and gas pipes are made almost exclusively of that material. In some respects the nature of cast iron is more suitable for pipes to be used for those purposes than that of wrought iron. The tensile strength of the material is, in such cases, of less importance than its ability to withstand compression, for the weight of the earth pressing upon a water main laid several feet beneath the surface is usually greater than the internal pressure of the water while in the case of gas pipes the strain is practically one of compression only. But a more important quality is its susceptibility of being moulded into any required shape—a quality that renders it well adapted for the formation of pipes, varied forms of which are continually required.

The manufacture of cast iron pipes is, however, attended with more difficulty than usually attaches to castings of a different character. The thickness of the metal being often no more than half an inch, any imperfection causes a serious diminution of strength, and this slight thickness increases the inability to an imperfection. Cast iron is classed according to the amount of carbon in combination with the iron, and the proper admixture of the various kinds in the foundry is a matter of the highest importance. The different kinds of iron have different rates of cooling; therefore, if a due admixture be not made, one portion will be fused before another,

and consequently will be burnt before the remainder has been raised to its proper degree of heat; or one part becomes solidified while the other remains in a state of fusion, and hence the casting will contain within itself the elements of its own destruction, by being brought into a state of unequal tension, or, as it is technically termed, hide-bound. A hide-bound pipe is liable to be destroyed by a sudden and sometimes slight change of temperature, a cold rain being specially likely to cause fracture. Metal which has been reheated in the air furnace has been found to possess a somewhat greater tensile strength than metal which has not been so re-heated, and it is the practice of some manufacturers to repeat their casting for pipes in the same way. But more frequently they are cast direct from the blast furnace. No harm can result from this latter method if due care is taken. The experienced workman knows by the bloom upon the molten mass whether or not it is fit for a pipe-casting and if unfit he pours it into pigs to be remelted with an admixture of other kinds in the air-furnace.

The presence of phosphorous in the iron renders it brittle and very liable to fracture; this quality is technically known as cold-short. Cold-short iron should never be used for pipes. The presence of arsenic, on the contrary, is said to improve the quality of the iron. It is perhaps, scarcely necessary to state that castings for pipes must be kept free of scoria and air-bubbles. The presence of the latter may often be detected, by sounding the pipe in every part with a hammer wherever an air-bubble is

detected, or even if its presence is suspected the pipe should be thrown aside as dangerous, if it is to be subjected to considerable pressure. To prevent air-bubbles remaining in the metal, pipes are often cast with a head, that is, with a mass of metal above that requisite for the pipe itself. This head compresses the mass below, and receives the air bubbles which ascend into it. When the casting has cooled, the head is cut off. Pipes produced in this manner are stronger and much more trustworthy than those cast without a head.

Small pipes are usually cast horizontally, or inclined at an angle of 45°. When large pipes are cast in this position the cores have a tendency to float, and so to give a greater thickness on one side than the other. Moreover, pipes which have been cast horizontally are not so strong as those which have been cast vertically. The latter position should therefore be adopted for all but small pipes. The same defect of having a great thickness on one side than the other may occur in pipes cast vertically if care is not taken to place the core truly concentric or if it warps during the process of drying. In vertical castings the socket end of the pipe is usually placed downwards, but this position may be reversed if required. It is important that all pipe-castings should be truly cylindrical, as otherwise the spigot ends will not fit the sockets. The thickness of a cast iron pipe is determined as much by the nature of the material as by the strain to which it is to be subjected. Cast iron is slightly porous, and is liable to many and considerable defects in casting especially

when the metal is thin, as in the case of pipes. Therefore a sufficient thickness is always given by the founder to ensure a perfect casting. This thickness except for very small pipes, is never less than $\frac{1}{2}$ inch and as a pipe $\frac{1}{2}$ inch thick is sufficiently strong to bear with safety any ordinary pressure, it may be stated that, for ordinary cases any pipe is, with respect to its thickness, sufficient for the purpose required. When, however, the pressure is to be excessive, or when the pipe is to be subjected to shocks, the proper thickness must be found by calculation.

All pipes before being used should be tested by hydraulic pressure upto three, or four times the head they will have to bear. They should also be carefully rung all over the surface with a hammer to detect the presence of air bubbles. As to appearance they should show on the outer surface a smooth, clear and continuous skin. When broken, the surface of fracture should be of a light bluish grey colour and close-grained texture, and both colour and texture should be uniform. It may be remarked, however, that the colour will be somewhat lighter, and the grain closer, near the skin, in consequence of the chilling which takes place there in casting. The iron should be soft enough to be slightly indented by a blow of a hammer on the edge.

The joints in pipes are usually made either by means of flanges or by spigot and socket. The former of these methods is always used for pumps, and usually whenever water pipes have to be set vertically. It is also well adapted

for joints that are required to be frequently loosened. India-rubber rings form the most convenient kind of joint for flange-pipes. Spigot and socket joint are generally used for water and gas pipes, for besides being more economical than the flange, they possess the advantage of allowing a departure from the strictly straight line by slightly enlarging the diameter of the socket. When the plain end is made to fit the faucet or socket exactly, the joint is made water-tight by means of red lead paint. In such cases, no deviation from the straight line is admissible. When the spigot and socket are made to fit loosely, the joint is run with lead, and if the socket is made sufficiently large, considerable deviation may be obtained. It must, however, be borne in mind, that a good joint cannot be made if the socket is much larger than the spigot.

VITAMINS OR THE VITAL FOOD ELEMENTS.

BY Vitamins we mean those vital elements in our daily food which, though hitherto unrecognised, nevertheless form the most important factor. In fact proper assimilation and nutrition are impossible in the absence of vitamins and continued feeding on a diet deficient in vitamins may lead to most serious results. Yet strangely enough they seem to defy all chemical analysis. It is possible to find out very minute quantities of arsenic in our food but even appreciable quantities of vitamins may elude the efforts of the chemists for no chemical tests have hitherto been discovered for the identification of these accessory food

factors as the vitamins are sometimes called.

CONTROL EXPERIMENTS.

How is it possible then to ascertain the presence or absence of such important factors in our food? Briefly, their presence or absence is determined not by chemical but by physiological Experiments. It was noticed that men or animals fed on certain kinds of food (subsequently found to be naturally deficient in vitamins) fell prey to certain diseases and when the error in their food was corrected and the deficient vitamins thus supplied, the pathological conditions set up by the wrong selection of food righted of themselves.

To test this control experiments were carried on chiefly on rats, fowls, pigeons and other animals but sometimes also on men (jail prisoners, &c) which amply confirmed the theory. It is not very easy for a layman to form an idea of the trouble and labour involved in carrying out such experiments for the subjects under experiments must be fed on "pure" proteins, carbohydrates etc. that is to say, proteins etc., without any vitamins and the preparation of such stuffs entails both labour and expense.

NUMBER OF VITAMINS AND THEIR CHARACTERISTICS.

Not long ago three or at the best four vitamins were known, called respectively A. B. C. & D. vitamins, some believing that vitamins A. & D. were really one and the same thing. According to the latest research on the subject two more must be added to the number, though the existence of the last at any

rate does not seem to have been thoroughly confirmed.

VITAMIN A—is soluble in fat and occurs naturally in many fats and oils, particularly in codliver oil, on account of which it is sometimes called codliver oil vitamin. It is also found in butter, yolk of eggs, and other fats but what is still more comforting, it abounds in almost all green leaves. All the other varieties too—at any rate the vitamins A, B, C—are found in green leaves. The vitamins, however, do not reside in the chlorophyll—the green colouring matter—as some might suppose, for the chlorophyll solutions have, when tested given no indications of vitamins. Deficiency of Vitamin A is particularly injurious to the young and growing children as it arrests their growth.

VITAMIN B—is soluble in water and is found in many plant seeds, certain portions of wheat and rice, yeast, germinated cereals and in many fruits and vegetables. The absence of this vitamin may result in loss of weight and failure of growth and if continued for some time the symptoms of the disease known as "Beri-beri" (see further) may be developed.

VITAMIN C—is found in certain juicy fruits such as lemon and orange and also in certain vegetables as cabbage. Lack of this vitamin leads to scurvy or sailor's disease, as the sailors were the greatest sufferers for want of fresh vegetables and fresh meat.

VITAMIN D—Occurs generally along with vitamin A and was long confused with it. It is an oily or waxy substance and its absence leads to rickets. A very curious and interesting thing about this

particular vitamin is that our bodies can manufacture a sufficient quantity of this substance in the presence of ultra-violet light or the sunlight. The skin must however be directly exposed to the sun for even very light articles of clothing as also the transparent window glass interfere with the action of these rays. People of tropical countries, specially those who are in the habit of having their bodies massaged with oil while sitting in the sun, need entertain no apprehension, so far as this particular vitamin is concerned.

VITAMIN E—also is said to be of an oily character and is said to be found particularly in wheat bran which fact emphasises the advantages of using wholemeal flour. Its American discoverers claim that the absence of this vitamin impairs the reproductive powers of the animals—the rats when deprived of this element being found unable to reproduce, though otherwise quite healthy. The results have not been amply confirmed.

VITAMIN F—is claimed to have been discovered by two German workers who maintain that it is found in yeast-extract and muscle and is substantially different from the other vitamins. The evidence about Vitamins E. & F. is, however, not considered absolutely conclusive.

It need hardly be added that in order to maintain us in a state of health, a proper quantity of all the vitamins must be included in our daily food. The deficiency of any one of them for a long period may give rise to any of the deficiency diseases characteristic of the particular vitamin.

BERI-BERI, ITS SYMPTOMS.

Beri-beri—which is the name given to the disease developed owing to lack of B. Vitamin—is a more or less Eastern disease being found chiefly among Chinese, Japanese and other rice-eating people. The chief symptoms of this disease are nervous and digestive troubles followed by paralysis and wasting of the limbs. Severe symptoms appear only at a later stage, loss of appetite and general debility being only noticeable in the beginning. The patient may sometime suffer from a dropsical condition of the lower limbs and in acute cases even of trunks and arms. Shortness of breath, unsteady gait and enlarged heart are other symptoms of the disease at a rather advanced stage.

ITS CONNECTION WITH FOOD.

At first it was supposed to be a tropical disease but spontaneous cases of Beri-beri in England, America, Australia, Europe, etc., made men think. Its association with food was long suspected but as the disease was generally found among poor classes of people, living chiefly upon rice it was attributed to an insufficiency of fat and protein. This was, of course, wrong, as has since been proved and people having fat in their diet may still suffer from Beri-beri. The rich escaped this disease only because their diet was more varied and contained fresh vegetables and fruits in which vitamins occur naturally.

VARIETIES OF RICE—THEIR FOOD VALUE.

As a result of numerous test experiments conducted by eminent physicians under different conditions the following conclusions have been arrived at.

In the first place, hand-milled rice was quite wholesome and did not create any tendency to Beri-beri while highly milled rice, in which the outer covering was completely destroyed, offered no protection against the disease. Secondly, the cured or parboiled rice, usually of a yellowish translucent colour was, in this respect, found much superior to the uncured or polished white rice commonly used in European countries.

HOW TO DISTINGUISH.

To distinguish the under-milled rice from the highly milled rice is not easy for every man but here science helps us. By straining a rice sample with a solution of iodine the difference may easily be known. Highly milled rice will stain almost black while the undermilled variety will give a light grey colour.

Beri-Beri and Wheat Flour.

The attack of beri-beri is not confined to rice eating people only but the use of white flour without green vegetables etc., is equally harmful. The substitution of white flour for brown flour has generally led to the development of this disease.

Beri-beri among Infants.

Nor is this disease confined to adults only. A very large number of infant deaths has, on careful investigation, been attributed to a disease which is identical with beri-beri.

Importance of Vitamin B.

The importance of Vitamin B to men and to animals is obvious. In fact birds and poultry have been found specially sensitive to the shortage of this vitamin.

(To be Continued.)

—By J. L. B.

The Paper that is most Wanted.

Which should be the most useful and interesting paper showing earning fields in India—to the Indian youths whom unemployment stares in the face in every turn.

Educated or not, with capital or without it, either from landed aristocracy or from the commoner, Indian youths are searching for avenues of employment—the State and the people are endeavouring to find the ways, but ways there are little. State service is occupied, trade and production highly competitive, agriculture unproductive and in other spheres none to show the way to plenty to the mass of young hopefuls that our universities turn up every year.

When INDUSTRY was started nearly eighteen years back with the object of showing these earning ways there were scarcely any paper in this line. But since many followed in its way and developed the idea INDUSTRY started to preach.

But are we going on the right line? The fact is that the country needs live, well-developed earning ideas to be preached. We want REAL MAGAZINE as long as magazine will fill the field of proper institutions to train the youngman in earning avocations. These, however, must be live and inspiring, leading the reader to real benefit—for themselves and for the country.

But are we moving in the right line? After seventeen years of work we must invite the readers to take a retrospective—what they have gained by reading INDUSTRY.

Moreover we must know in what way our service will better reach the class for which we are catering. We are now reaching twenty thousand doors at present. We wish we could reach twenty thousand more homes.

And before we commence the next volume in April next we must know from our readers what INDUSTRY has done for them and what it can further do.

The question is HOW Industry service can be developed to be of real utility.

Should not our readers reply before we launch our programme for the eighteenth volume?

THE PINE APPLE

(Its Cultivation in Travancore.)

A difference of opinion can hardly exist about the pine apple as a delicious fruit. Those who have had the chance of once tasting it do not forget its taste soon. It has a flavour, remarkably unique and unmistakable which combined with its coloration has a pleasing effect on the senses. These effects on the consumer undoubtedly go far towards fattening the cultivator's purse. Indeed they work wonders in that line.

The cultivation of the pine apple is simple so far as Travancore is concerned. This article is confined to the particular State as it produces a good lot of these delicious fruits. In fact the cultivation of the pine apple is more or less as significant and remarkable as that of any other staple crop. But with all the large amount of production our farmers benefit only very little. They dispose of their fruits in the local markets where foreigners well versed in the poverty of the farmer, offer a miserably low price for which the poor farmer is forced to sell it against his own wishes for the sake of his wife and children almost on the verge of starvation at home.

The system of planting adopted throughout the State is very simple. The land is laid out just as for other crops, i.e., ploughed or dug up free of other vegetation. In this land pits $1\frac{1}{2}$ x $1\frac{1}{2}$ x 1" are taken at regular distances of 4 or 5 ft. from one another. The pine apple being a shallow rooted crop some farmers take about 6 in deep.

Both these methods are in vogue and so far it has been observed that the deeper pits give better fruits. These pits are covered half way up from the bottom with the same soil that was removed from them. But the soil is made free of clods and other undesirable things. Above this layer of soil about 16 or 17 lbs. of well prepared farmyard manure is added. This manure and the soil below is then well mixed.

The ordinary pine apple plant gives rise to buds in the axil of its leaves. These grow up all round the adult plant. These buds or suckers, as they are sometimes called, are removed from the parent plant and are placed in the middle of these prepared pits with about an inch or two of the bottom portion buried in her soil. This sort of transplanting is done just before the beginning of the monsoon, that is to say, about the end of May. These seedlings take full advantage of the preliminary rains and come up well.

Each fruit of the pine apple has a tuft of leaves at the top of it. This resembles a seedling or sucker in every way. If we plant these, instead of the seedlings from the adult plant, they fruit only in the third year while the regular seedlings fruit in the second year or in certain cases after eighteen months. Hence the seedlings from the plants are in every way better for planting than the tufts of the fruits.

There are, in Travancore, four distinct varieties of the plant. They may be classified under two main heads as follow.

Thornless	
Large Fruit With no Seeds inside I	Large Fruit With Seeds inside. II
Thorny	
Small and Sweet III	Small and a bit sour and irri- tating. These have red hair like leaves all over the fruit even when tender IV

The first and second varieties have fruits mostly a foot long and nearly 8" in diameter. The third variety has fruits about 8" or 9" long and about 5" or 6" in diameter. The second and third are sweeter than the others. In fact the first also is sweet enough and very juicy. The last one is not relished much and so is not widely cultivated.

The estimate for a hundred plants are as follows:—

	Rs.As.P
Clearing land about 1300 sq. ft	
Preparing Land	7—0—0
100 pits 1' x 1' x 1'	5—0—0
100 Suckers	2—0—0
1700 lbs. F. Y. M	3—0—0
Filling pits and planting	4—0—0
Mulching and Hilling	6—0—0
	32 0—0
Marketing and Sundries	3—0—0
	35—0—0

Total Expenditure=Rs. 35

100 fruits at 8 as per fruit=Rs 50

Also

300 suckers at Rs. 2. per 100=Rs. 6

Total Return=Rs. 56

Profit=Rs. 21

These are in accordance with the affairs in Travancore. Here the rates

may be more; but the value of the fruit also is proportionately large.

It is thus shown that the cultivation of pine apple is a profitable one.

It is very useful to note in this connection that clipping away a few leaves of the tuft at the top of the fruit increases the bulk of the fruit. Complete removal however is harmful to the fruit since it leaves a depression where water or other dirt may accumulate doing damage. The fruits can be covered up by the leaves of the plant soon after fruiting by folding them upwards and tying them up above the fruit. The plant then presents a conical appearance. This sort of tying furnishes an effective protection for the fruit against jackals, polecats, rats and other night prowlers. It also protects the fruit from intense sunlight which in certain cases brings about sourness in the fruit. In summer mulching should be done and the soil must be heaped towards the plants.

After harvest, the suckers from the mother plant, when they are sufficiently mature, should be transplanted. Certain farmers out of carelessness or neglect fail to do so with the result that the plot in a period of three years is converted into a veritable wilderness very hard to be cleared. The plants grow very rapidly and two or three suckers from each plant when grown up, and many more from each of these coming up, present a spectacle that can be easily imagined. The fruits also lose their size and quality due to such neglect.

The fruits have great keeping quality. They remain fresh for days together. The department of Agriculture, Travancore, had sent a few tins of canned pine apples to be exhibited at Wembley. Those preparations were very much appreciated and they are of opinion that the canning of the fruit, if taken up, will undoubtedly become a profitable enterprise since there is a good market for them in foreign countries.

—THE AGRICULTURAL COLLEGE
MAGAZINE.

New Ideas for Small Capitalists.

Prepared Powders for the Hindu dish.

Mr. E. Lakkaraju Naidu, Chemo House, Kharida Bazar Road, Kharagpur, sends us the following:—

Raygi gunda is the powder of the dried pulp of plums (Topa Kul-Beng.) a stony berry of a thorny bush largely found in the waste lands, village surroundings and fruit in the months of January to March of every year. The fruit is collected by the villagers, junglies and brought to the local market for sale.

Purchase as many fruits as can be had, plums with small seed and thick meat or pulp being selected foremost. A basket of these fruits do not cost more than six to eight annas. Dry them in the sun for a week until all the juice is dried up and they are fit for pounding. The fruits are pounded in an ordinary denki (huller), the stones are screened and the coarse powder which is left is collected.

Plum powder	1 seer.
Chillies	1 chattak
Cumin (jeera)	1 tollah.
Salt	1 poa.

Pound the chillies first and add the plum powder. Pound them together finally adding cumin and salt until finely powdered. Pack this powder in $\frac{1}{4}$, $\frac{1}{2}$ and 1 lb. tins and use decent labels naming the powder as "Indian Plum Powder" for the table with directions for use. Every eight annas worth of fruit will give $1\frac{1}{2}$ seer of finished powder and they can be very easily sold if the pound tin is priced annas eight, $\frac{1}{2}$ lb. five annas and $\frac{1}{4}$ lb. three annas. A profit of eight annas can be easily made on every basket of raw material purchased.

Directions for use.

Take 1 tea-spoonful to 1 table-spoonful of powder and mix with the first portion of the meal (rice) with little ghee or til oil. Many well-to-do families in the South use such powders with their diet. This is one of the vegetable powders used.

(B) Below is given another variety which is a non-vegetarian (fish) powder. The raw material used is Shrimp (Singidi—Beng: Gingay—Hindi; Kuna Raiah—Telugu).

Singidi	1 viss.
Chillies (dry)	$\frac{1}{2}$ seer.
Cumin	1 chattak.
Coriander	1 poa.
Salt	to taste.
Garlic	1 chattak.
Til oil	$\frac{1}{2}$ chattak.

Fry singidi, coriander and add chillies, cumin, garlic and finally salt. The powder is made fine. Pack this also in tins of the size noted in item 4 (supra) label and put them in the market. All grocers and provision dealers will readily take and stock them.

A lady can easily send her products through any male member of her house or a reliable servant to the market. They can also help her in collecting raw materials, tin cans, labels, wrappers etc. 1 viss (equal to 3 lbs.) of singidi is retail sold for a price ranging about Re. $1\frac{1}{8}$ -. But if a contract is given to any fisherman it can be procured at a less price and in large quantities. Always dried singidi should be used for the powder. When all other ingredients are estimated to cost as. - $1\frac{1}{2}$ - the finished product will hold in 6 pound tins.

Singidi	1	8	0
Other ingredients	0	12	0
6 tins	0	6	0
Labels wrappers etc.	0	2	0
Cooly, conveyance, mis. expenditure	0	2	0

Rs 2 12 0

Each pound tin of singidi powder can be sold from annas twelve to one rupee each. Allow a decent commission to the grocer; even then one can make a profit of 40 to 50 per cent. on the capital.

Small Trades & Recipes.

Lemon Drops.

Ingredients: 1lb. sugar candy, juice of three lemons, whites of two eggs. Mix the lemon juice with the sugar, then beat in gradually the whites of eggs. Boil until the mixture candies, then cover baking tins with paper dusted with castor sugar, and drop the mixture from a salt-spoon on to this and put in the oven for a minute or two to set.

Orange Drops.

To make these delicious sweets grate the rind of one orange and squeeze the juice, taking care to reject the seeds; add to this a pinch of tartaric acid, then stir in confectioner's sugar until you have it stiff enough to mould into shape with the fingers. Form into small balls, and set aside to dry.

Pyrophorus.

Pyrophorus is any substance that inflames spontaneously when exposed to the air. It is prepared as follows.

Neutral chromate of lead, 6 parts, sulphur 1 part; triturate them with water, sufficient to form a paste, and make this into pellets; dry these perfectly by a gentle heat, then heat them in a closed tube until the sulphur is all driven off; lastly transfer them to a stoppered phial.

To Preserve Fruit.

Pick the fruit from the stems and put it into bottles, which must be quite filled; place the corks loosely in them, and set them upright in a pan of warm

water; place them on the fire, and heat the water until it nearly boils; let them stand 15 minutes, then fill each within an inch of the cork with boiling water; cork tight, and let them cool. Pack them on their sides to keep the corks moist. The fruit is better when not quite ripe; in this case it will keep two or three years.

Coloured Stencil Ink.

Shellac, 4 parts; borax 1 part. Dissolve in a small quantity of boiling water and dilute with hot water to the consistency of very thin syrup, to this add a sufficient quantity of logwood, or Brazil wood extract, or soluble coal-tar reds, for red. For blue, add to the lac solution soluble Prussian blue or blue earmine.

Manufacture of Rubber Stamps.

For this a vulcanising apparatus with lamp and thermometer, as used by dentists, is required, and an iron chase, in which the types are firmly held. The types are oiled in the usual manner, and the vulcanite poured over them. The matrix is not allowed to become dry, but a plate of vulcanised caoutchouc is laid upon it. The caoutchouc is forced into the matrix by pressing between two iron plates; a few sheets of paper being placed between them to prevent the caoutchouc from sticking to the matrix. The whole is then placed in the water of the vulcanizing apparatus, and heated to 305° F. After it has become cold the mould is taken out and the caoutchouc detached.

INDIA'S INDUSTRIAL PROGRESS.

Tata Iron and Steel Co.'s Extensions.

Under the protection policy of the Government of India, the Indian iron and steel industry has taken a big stride forward and many important developments are now in progress. The programme of the Tata Iron and Steel Co. extends over a period of eight years from 1926-27. The main items of new construction are: Modern plant and improvements in existing plant designed to economise fuel; erection of a third duplex tilting furnace to increase the steel capacity; erection of a hoop and strip mill to enable the company to roll strip, and power plant, cranes and tracks necessary to supply the additional power and handling facilities which the larger production will require.

Blankets for Berar.

There is a variety of woollen material that Berar absorbs in large quantities, viz. Blankets, which are in great demand. Not only is the blanket of use to the cultivator for covering at night, but it also serves the purpose of umbrellas. That is, it is worn during the monsoon to protect the person from rain and also serves to keep the body warm. Umbrellas are used, but not to the same extent as in Bengal. The woollen blanket is thus largely imported into Berar, and different grades of this blanket are marketed. The cheaper variety is thinner and more loosely woven and mixed with cotton but the all-wool variety employs no cotton although there is only a small difference in their prices. All are, however, manufactured from coarse wool and, as neither wool is obtainable in Berar nor any attempt has been made to weave blankets from imported wool, these blankets are imported from Bihar and elsewhere. Grey cotton blankets also find a market there and are retailed at half the prices of the woollen

blanket. The cultivator usually invests in these during the cold weather for home use.

Emporiums and Exhibitions.

As Emporia are the best media for advertising the products of cottage industries of a province, they are a regular feature in all advanced countries. To give a few instances, there is the Technical Institute in Madras with buildings of its own, manned by a highly trained staff. The superintendent tours into the interior of the Province, finds out the best workers and places orders for special classes of goods. When the articles are received, they are displayed at the Institute to the best advantage. The Bengal Home Industries Association, an activity of the Government of Bengal, does similar work. The Association has printed very attractive illustrated catalogues and circulates them widely and organises numerous exhibitions. A large sum is spent in this direction.

The Director of Industries of Mysore is making arrangements to establish an agency and sales room in Colombo to popularise Mysore artistic industries, such as wood and ivory carving, this being part of a big programme which the Mysore Government is just now carrying into effect. Such agencies and sales rooms are to be opened in large cities like Delhi, Bombay, Calcutta, Madras, and also in Foreign Countries like America. The silk cocoon exhibition is an important annual event in the sericulture of the Punjab. In England, Australia, Canada, and other highly developed countries industrial exhibitions on very big scales are regularly held and thus those countries have organised and improved their industries to the highest level of perfection.

SCIENTIFIC AND TECHNICAL TOPICS.

Dearer Than Gold.

There are quite a number of metals worth a good deal more than mere gold. Many of them occur freely in the British Isles.

Osmium is twenty-two and a half times heavier than water and much more precious than gold. Iridium which, like osmium, is found in a variety of platinum ore, is extremely hard, and of the two combined fountain pen points are made. Titanium and uranium, which are found in Cornwall, are worth nearly twice as much as gold. Lustrous white palladium is worth two and a half times as much, and rhodium and ruthenium five times as much.

The light yellow calcium and strontium, and vanadium are still more valuable metals than gold. So are the silvery-looking rubidium and caesium, and gallium a bluish-white metal discovered 50 years ago in the Pyrenees. Only 40 years ago germanium was discovered near Freiberg, in Saxony. Cerium, yttrium, phosphorine, neodymium—still more candidates stand in an eager queue, ready to apply for gold's proud job as the standard symbol for high values in the monetary transactions.

Glow-Worm's Rivals.

In country lanes glow-worms are not the only living things that are

luminous. Several plants and parts of plants have the power of shining in the dark.

There is, for instance, a luminous moss. It can be seen in crevices among rocks and large stones by the roadside, sometimes in large patches measuring six or seven inches across. The common formentil gives off a light, too—just near the roots. If the roots are dug up and the soil cleaned off them, they will be clearly outlined in the darkness by a pale green phosphorescence.

The light given off by decaying wood is common enough, but few people notice a more common sight still—the light given off by leaves. This can be seen frequently at this time of the year. Beech and oak leaves are falling fast, and when they start decaying they glow with the same kind of light that comes from fresh fish.

This light is caused by tiny threads that are interwoven into the plants and are essential to their health; although often they do not start glowing until the plants themselves are either dying or dead.

If the underside of a glowing beech-leaf is examined under a magnifying glass, small yellow spots will be seen. These are the centres of the fibres; and if one is disturbed with the point of a pin it will glow more brightly for a few moments.

At one time or another scientists have seen and recorded the glows of grasses, a lily (the *Lilium bulbiferum*), a poppy (the *Papaver orientale*), and the common nasturtium; but to see these faint lights needs special apparatus. Further, their power of glowing exists only in the latter parts of their blooming season.

Vitamin and Orange Juice.

The lack of vitamin A. leads to rickets and a lowered resistance to tubercle and other infections. The lack of vitamin B. leads to the disease known as beri-beri. A deficiency of Vitamin C. leads to scurvy. Orange juice contains noteworthy amounts of vitamins A, B and C.

As a result of a medical test in America it was noted that calcium assimilation decidedly benefitted when oranges formed a part of the diet, the increased retention being considerably greater than the calcium in the oranges. (Calcium is a bone-forming element) The increase of phosphorus retention was even more marked than that of calcium, more than three times as much phosphorus being assimilated when orange juice was added. The magnesium retention was also increased.

Eucalyptus as a Valuable Remedy.

There are few houses that cannot produce a bottle of eucalyptus oil from the medicine cupboard, but as a rule nobody thinks of uncorking it unless there are colds about.

It seems not to be generally known that this admirable essence is more

effective than anything else as a cure for bruises, knocks, and even sprains. When dabbed on at once, or applied on a square of lint and bandaged lightly over the bruise, its action is quite remarkable.

Not only does it soothe immediately but it will prevent the bruise from blackening quite as well as any application of the best unguent.

For toothache too, a little eucalyptus on the gum, or a plug of cotton-wool soaked in the oil, will often prove efficacious. Yet a further use is for the removal of stains from delicate fabrics such as chiffon, crepe-de-chine, etc. It rapidly absorbs most kinds of stain, and being itself highly volatile leaves no mark behind it.

When used for colds it is usually inhaled, but it can safely be given internally, when it has a wonderfully warming and anti-catarrhal action. The easiest way to take it thus is to allow a lump of sugar to absorb as much of the oil as possible and then to eat the sugar. Children as a rule will quite enjoy if given in this manner.

Copper Coating of Aluminium.

A process for coating aluminium with copper is described in a technical Journal. It consists in first placing the parts for a short period in a solution of boiling copper nitrate, then washing them in clean water and plunging in a bath of boiling concentrated copper-sulphate solution, allowing them to remain 15 minutes to half an hour. The article is then found to be covered with a dense, fast-adhering copper coating which can be easily ground and polished without tearing or exfoliating. Care must, however, be taken to ensure that the parts, from being taken off the copper nitrate bath up to placing into the sulphate solution, are exposed to the atmosphere as little as possible.

Any desired metallic coating may be superimposed in the usual way, or welding done, as the copper coating gives a good base for adherence.

FORMULAS, PROCESSES & ANSWERS.

Principles of Telegraphy.

2882. S. D. Bijnor.—Requests us to explain the principles of Telegraphy.

Telegraphs may conveniently be classed according to the mode in which the actions of the sender produce their effect at the point where the message is received. A first class may induce those in which the current is made to deflect magnetized needles; a second may comprise those in which the current, by magnetizing soft iron, causes an index to travel along a dial and point to the letter intended; a third may embrace those in which the same action on soft iron is made to print the despatches either in ordinary type or in conventional signs; while in a fourth class we may put the instruments which give their indications by sounds only. It is obvious that in some of these systems signs only are used, and a special training and acquaintance with the symbols is necessary, while in the rest the ordinary alphabetic letters are shown or recorded. In the former case the apparatus is simpler, and therefore for the general business of public telegraphy it is almost exclusively employed; while for private purposes, where it is often required that the messages should be despatched and received by persons not acquainted with the symbolic language, the dial telegraph, or that which prints the message in ordinary characters, will continue to be employed, in spite of the greater com-

plexity and greater liability to derangement of the apparatus.

Candied Orange Marmalade.

2126. M. N. Hisipaw.—Wants a recipe for orange marmalade.

Cut good ripe oranges into two, take out all the juice and pulp into a basin, and pick all the skins and seeds out of it. Boil the rinds in hard water till they become tender and change the water two or three times while they are boiling; Then pound them in a marble mortar, and add to it the juice and pulp; put them next into a preserving pan with double their weight in loaf sugar, and set it over a slow fire. Boil it rather more than half an hour, and put it into pots; cover it with brandy paper, and tie it close down.

Plantain Fibre Extraction.

2534 J. V. Burma.—Wants to learn the process of extracting plantain fibre.

The following is the mode of preparing plantain fibre in Jamaica:—

The plantain is cut when ripe and the outside layer is split in longitudinal slices and put through a mill, and afterwards boiled in a copper, with a small quantity of potash, soda, or quick-lime, to take off the mucilage. This layer is the coarsest, and requires a longer time to boil, therefore is to be done separately. The next layer is to be done the same way, and being finer and more valuable

should be kept by itself. The following also is to be treated similarly as well as the centre part of the plantain.

As the inner part is the finest fibre it requires the shortest time to boil, and commands the highest price, that is the reason why these boilings require to be performed separately.

After boiling the fibre is hung up on ropes to dry, and it can then be carried and sold off.

Printing Ink.

2887. L. G. D. Dharwar.—Wants a simple recipe for preparing printing inks

A superfine black printing ink may be made easily by the following formula. Take of balsam of copaiba (pure), 9 oz., lampblack, 3 oz.; indigo and Prussian blue, of each, $\frac{1}{2}$ oz., Indian red, $\frac{1}{4}$ oz., yellow soap (dry), 3 oz.; grind the mixture to an impalpable smoothness by means of a stone and muller. Canada balsam may be substituted for balsam of copaiba where the smell of the latter is objectionable but the ink then dries very quickly

Artificial Slate.

2715. A. & C. Jullunder.—Enquires how artificial slates are made.

Convert black slate into a fine powder, sift the powder and rub it with water upon a stone. When dry rub it again with the muller and then add to 8 parts of the slate powder 1 part of lamp black, mix thoroughly with glue water, and boil the whole over a moderate fire. Then apply a thin and uniform layer of the composition to an iron sheet, let it dry

and repeat the process until the coat has the proper thickness then pumice it and finally apply a coat of infusion of gall-nuts.

Potato Ivory.

1911. T. N. A. Cawnpore.—Asks how potato ivory is prepared.

Make a solution of 4 parts of sulphuric acid in 50 parts of water. Treat peeled potatoes with this solution for 36 hours. Dry the mass between blotting paper, and subject to great pressure. By using very strong pressure, billiard balls have been made closely resembling ivory. The material can be carved, and doubtless could be used for large types.

Milk of Roses.

2862. M. N. B. Calcutta.—Requires some hints for making milk of roses.

In making the milk of roses, the chief object should be to produce a perfect emulsion, or one at least which, if it separates after long repose, may be restored to a homogeneous state by slight agitation. It must also be recollected that, though other perfumes may be and are commonly added to it almost at will, the scent of roses should predominate and form its characteristic odour

Manufacture of Celluloid.

2722. H. C. S., Calcutta.—Wishes to learn the process of celluloid manufacture.

Any substance containing cellulose, or vegetable fibre free from incrusting components, unsized paper, cotton, wool, linen, hemp, white rags cut fine and per-

fectly clean, certain varieties of white wood, may be used as material in the manufacture of celluloid. They are dried at 212° F. ground up, and stored in a place free from moisture. Three vessels of glass or any other material not liable to be attacked by acids are required for converting the cellulose into pyroxyline. The cellulose is first soaked in one of the vessels for 10 to 15 minutes in acids; it is then pressed out, transferred to the second vessel containing fresh acid, consisting of a mixture of 3 parts of sulphuric acid of 1.834 specific gravity and 2 of concentrated commercial nitric acid. The acids in the first and second vessels may be used in subsequent operations by raising the temperature to about 86° to 95° F. and keeping the material in the bath for a few hours. When the conversion is complete the pyroxyline is pressed out and freed from adhering acid by washing it in the third vessel. It is again pressed out and further washed in tanks resting on an inclined plane and fed with running water. To convert the pyroxyline into celluloid, 42 to 50 parts of camphor are intimately mixed with 100 of pyroxyline, wrapped in a strong tissue capable of great resistance, then enclosed in bags made of horse-hair cloth, and placed between the plates of a warm press, and subjected to pressure for 1 hour or longer. The cakes remaining in the bags can then be brought into a heated cylinder press, and next into an apparatus in which a vacuum prevails, while the cylinder jacket contains such substances as chloride of calcium, concentrated sulphuric acid, etc., for the absorption of moisture. Resinous or

other substances and, colouring matter may be incorporated with this product, to obtain uniformly coloured or marbled masses. Celluloid made by this and similar processes becomes plastic when heated, and may be cast.

Foam Syrup.

2739. S. B. Poona.—Wants a recipe for foam syrup.

A harmless gum foam is prepared as follows.

Digest 100 parts of Panama wood for 8 days with 400 parts of water and 100 parts of spirits of wine (90 per cent). Pour off without strong pressure and filter.

For every 5 parts of lemonade syrup take 5 parts of this extract, whereby a magnificent, always uniform foam is obtained on the lemonade.

Developing and Toning Bromide Paper.

2938. B. M. J. Radhanpur.—Requires some hints on developing and toning bromide paper.

Place print in 10 per cent. potash bromide solution for 5 to 10 mins (1 or 2 min for fresh paper). Wash and develop in:—(a) Hydroquinone, $\frac{1}{2}$ oz; soda sulphate, 2 oz; water, 110 oz. (b) Potass bromide, 15 oz; soda carbonate (recrystallized) 12 oz, water, 112 oz. For normal results:—(a) $\frac{1}{2}$ oz; (b) 1 oz water, $\frac{1}{2}$ oz. For greater contrast:—(a) 3 dr; (b) 1 oz; water 5 dr. For less contrast:—(a) 7 dr; (b) 1 oz; water, 1 dr.

Tea Extract.

2897. K. T. A. Agra.—Wants a recipe for making tea extract.

Tea, 1 part; boiling water, 7 parts. Digest at a heat of 170° for half an hour, and evaporate in a low temperature in a vacuum. In this way can be made an excellent extract of tea, which preserves many of the virtues of the leaves, and will produce a cup of decent tea by adding a few grains to the hot water. The lower the temperature at which the evaporation is carried on, the finer the quality.

Extraction of Mercury.

2857. D. R. Vizianagram.—Asks how mercury is extracted from ores.

Mercury is usually obtained from locally concentrated deposits of mercuric sulphide—cinnabar, or cinnabarite—more or less intermixed with the metallic oxides, earths, bituminous matter, iron pyrites, arsenical or antimonial compounds, and ores of gold, copper and zinc.

Two general methods are available on a large scale for the reduction of cinnabar. The one depends on the oxidation of heated cinnabar by air, mercury vapour and sulphur dioxide being formed; in the other the cinnabar is heated with lime in a vessel from which air is excluded, calcium sulphide and sulphate are formed, and mercury vapour is set free; instead of lime, iron in the form of smithy-scales can be used. In every case the reactions take place at a temperature exceeding the boiling point of mercury so that the condensation of the vapour is an essential part of the process.

How to Test Eggs.

2703. M. N. Morui.—Asks, "How to test eggs."

The testing of eggs, whether for fertility or the quality of their contents is very essential. By testing for fertility one is able to give broody hens their full complement of fertile, and so hatchable eggs, and what is more, the eggs that are left are all the better for the removal of addled or bad eggs. An expert tester can put egg in his hand, and holding it up to the sun say whether it is fertile or not. He would also be able to test an egg satisfactorily after it had been incubating only three days. The novice will, however, be content to test the eggs on the seventh or even tenth day and make a second test for fertility on the fourteenth. The earlier the test the better, for then any unfertiles can be removed from under the hen or from the incubator and fertile ones added.

If an egg-tester be employed, in a fertile egg a small spot will be seen—the live embryo—and going in all directions therefrom will be seen veins, the whole resembling a spider in a web. If an egg contains a dark mass that moves to and fro, and the spider-like form is absent and the air-cell line misty, the egg may be removed as containing a dead germ. These "dead" or addled eggs give off poisonous gases, and such must prove harmful to other eggs containing live germs if they are not removed as early as possible. Any doubtful eggs should be marked and left for the second testing. Do not prolong the testing to spoil the eggs.

Source of Musk.

2779. G. S. K. Rawalpindi.—Wants to know the source of musk.

Musk is derived from a deer which attains the size of a small goat and, like the chamois of the Alps, lives on the highest mountains of the Himalayas. Only the male animal produces musk, which is secreted in a sac or rather gland near the sexual organ. The musk bag cut by the hunter from the body of the animal has the size and shape of half a walnut. The musk present in the glands differs in appearance with the season and the age of the animal. The hunters dry the bags either on hot stones or in the air, or they dip them into hot oil. In commerce musk occurs either in bags under the name of moschus in vesicis, "musk in pods" or free, moschus in grains moschus ex vesicis, "grain musk."

Artificial Ghee by Hydrogenation.

2998. M. L. M. Multan City.—Wants to know how the so-called vegetable product or artificial ghee can be made by the hydrogenation of oil.

The solution of the problem of converting fluid oils into solid fats may be regarded as the greatest advance which has taken place in oil industry during the last few years. What is known as hydrogenation is one of the most recent improvements in oil treatment. By treating a liquid oil with hydrogen gas in the presence of a catalyst and at a certain definite temperature and pressure liquid oils such as ground nut or cotton seed can be converted into solid fats like ghee or tallow. The equipment required

is very complicated and rather expensive. The demand, however, for a cheap and wholesome ghee substitute, may yet lead to their establishment. It has been suggested also that, in the case of sesame oil, it might be possible to create an export trade in hydrogenated sesame oil, instead of exporting the more liquid oil.

The early products of the hydrogenation process were used exclusively for technical purposes, such as soap making and the manufacture of candles, and it was sometime before edible hardened fats were prepared. When the processes had been sufficiently simplified all kinds of oils were hardened, and used in the manufacture of margarine, artificial lard, and the like. For example, instead of using mixtures of oleostearins, these oils were hydrogenated either alone or in admixture with soft fats, such as coconut oil, until products of the required consistence were obtained.

Talcum Powder.

2608. M. L. W., Poona city.—Wants a recipe for talcum powder.

Base.

Powdered talc	22 lbs.
Magnesium Carbonate	2½ lbs.
Powdered boric acid	1 lb.

Mix

Perfume.

Carnation Pink Blossom	2 oz.
Ext. of trefle	2 dr.
To 12 dr. of this mixture add	
Neroli	1 dr.
Vanilin	½ "
Alcohol to	3 oz.
Sufficient for 25 lbs.	

Methylated Spirit.

2515. U. G. T. M., Kotah.—Asks "How can methylated spirit be made on a small scale?"

Methylated spirit is usually prepared by mixing 10 parts of wood naphtha and 90 parts of commercial spirit of wine with $\frac{1}{2}$ per cent of refined petroleum oil; latter is added owing to restrictions being placed upon the spirit by the Excise Authorities, so as to render it unfit to drink, it also contains very small quantities of acetic acid and resinous bodies. Commercial spirit of wine contains 86 per cent of pure spirit or alcohol; it is very little used in preparing spirit varnishes on a large scale

Bottle Capping Mixture.

2271. M. S. T. Pegu.—Wants a recipe for bottle-capping mixture

The following recipes will yield a good mixture for sealing bottles.

(1) Soak 7 lb. of good gelatine in 10 oz. of glycerine and 60 oz. of water and heat over a water bath until dissolved; the mixture can be coloured by the addition of pigments. The resulting compound should be stored in jars. To apply, heat the mass to a liquid and dip in it the cork and portions of the neck of the bottle. It sets very quickly.

(2) Melt together 6 oz. of resin, 2 oz. of venice turpentine, and add 9 oz. of lamp black or other colouring matter.

Different Kinds of Sands.

1521. K. G. S. Raffiokt asks: How are sands classified?

Sand is found strewn upon the surface of the earth, in strata at certain depths or forming the beds of rivers or

shores of the sea. Sand may be divided into two classes, "siliceous" and "Calcareous," but it is more particularly denominated according to the nature of the predominant constituent, as siliceous sand, iron sand, etc. The siliceous sands are pit sand, river sand, and sea sand. By examining the particles composing sand the source from which they are derived can easily be ascertained.

Preparation of Pearlash.

2637. M. H. P. G., Medak.—Wants to learn how pearlash is prepared.

Pearlash is prepared by calcining crude potashes on a reverberatory hearth, dissolving the calcined mass in water, and after repose, decanting the clear solution, and evaporating it to dryness in flat iron pans, the product being constantly stirred towards the end to reduce it to a semi-granular state. Although purer, its richness in absolute alkali is less than that of the potashes from which it is prepared, being only from 47 to 51 per cent.

Ink for Draughtsmen.

2967. G. P. Gharhwal State.—Wants to know how ink for draughtsmen are prepared.

For draughtsman's work Chinese or Indian ink rubbed up from the solid stick is the best. To prepare this, pour a few drop of clean water into a smooth 4 in. or 6 in. colour saucer, and rub the stick of ink with a circular motion and moderate pressure from five to ten minutes or more, according to the quantity of water. To judge when the ink is thick enough for use, blow on the surface, and the consistency can be estimated by the quickness or slowness with which the disturbed surface returns to a level. If too thin, a grey line will result, and if too thick, the ink will not flow freely from the pen. Some draughtsmen use a small marble slab for rubbing up the ink, from which it is scraped into the saucer and a little more water added to bring it to a working consistency.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from your experts will be published free of charge. Questions are not generally replied by post.]

2675 J. F. C., Castle Rock.—Canes may be bought of P. C. Coomar & Nephew, 71/E, Clive Street and Malayan Cane & Timber Co., 10, Sukea's Lane, Kamari House; both of Calcutta. For patent leather enquire of Civil Boots & Leather Works, 10, Old Post Office Street, National Tannery, Martin & Co., Clive Row, The Indian Tanneries, Chartered Bank Bldg., Clive Street and Calcutta Industrial Leather Works, 1, Pollock Street; all of Calcutta. For electric ploughs write to Ford Motors Ltd, 110/1, Russa Road, Calcutta. For securing buyers of country mats advertise in the pages of **Industry**.

2676. H. E. D., Kulmunai.—Cloths may be supplied by J. David Sassoon & Co., Esplanade Road, Bombay; Dharmsey Karemsay, Shaik Memon Street, Bombay; Jamnadas Hari, Moolji Jaitha Market, Bombay; Mathurada Morarjee, Shaik & Memon Street, Bombay; Bilasram Thakarsidas, Harrison Road, Kettlewell Bullen & Co., 21, Strand Road, Ralli Bros. & Co., 1 & 2, Church Lane and Kerr Tarruk & Co., 11, Clive Street; last four of Calcutta.

2677 M. L. J., Dwalia.—Process you require will appear in an early issue.

2680 S. B. S., Santipur.—Your query being in the nature of an advertisement should not be published in these columns.

2681. K. N. K., Mangalore.—Vegetable ghee may be supplied by E. D. Sassoon & Co., 100, Clive Street and Andrew Yule & Co., 8, Clive Row; all of Calcutta. Fancy goods are imported by Laurel Novelty, 43, Park Street, Calcutta; Mohamedbhoy Jivabhoj & Co., Nizam St., Bombay 9; Indo-German Trading Co., Cocanada; The Union Trading Co., 166, Harrison Road, Calcutta. Battery for pocket lamps may be had of Calcutta Stores, 7/1, Tagore Castle Street, Calcutta. Pictures may be bought of Sett Chowdhury, 8, Cross Street, Calcutta and Roy Babaice & Sons, Lower Chit-

pur Road, Calcutta. 'Wants to be put in touch with dealers in raw ginger, barley, arrowroot, wheat, beeswax, honey, ghee.

2684 D. H. C., Karachi.—Alkanet root is "Calpat" in vernacular. Bela Oil is a kind of floral oil derived from Bela flower.

2685 H. L. S., Rangoon.—For selling tobacco leaf you may correspond with the following cigar manufacturers who require tobacco leaves in large quantities. Burma Cigar Factory; Burma Tobacco Co., Ltd., Merchant Street; Victoria Cigar Works, Tanlay Street, and The General Tobacco Co., Ltd., Merchant Street, all of Rangoon.

2687 H. S., Sialkot City.—There is no treatise only on gut manufacture. Leather Manufacture by Mr. Alexander Watt has a Chapter on gut manufacture. You may consult this book that may be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2688 D. A., Shankerpally.—For small presses and types enquire of Ashutosh Auddy & Co., 16, Lower Chitpore Road and K. Banerjee Post Box No 532; both of Calcutta.

2690 P. Y. R., Vatavakily.—For fibre extracting machines enquire of Oriental Machinery Supply Agency Ltd, 20/1, Lall Bazar Street, Calcutta. For starting business with a small capital go through Small Trades and Recipes and New Idea columns of **Industry**. For removing thorns from prickly pears shave with a knife. Formulas and recipes appear regularly in the columns of **Industry**.

2691 J. M. N. K., Kaimganj.—Knives may be supplied by Henry Rogers Sons Co., Ltd, 82, Eyre Street, Sheffield and W. T. Stanforth & Co., 66, Button Lane, Sheffield. Wilson Goggles may be supplied by Wilson Goggles Co., Inc., Reading, Pennsylvania, U. S. A. and Julius Faber A-G, Stuttgart, Germany. Names of buying agents will be found in December issue of **Commercial India**.

2692. U. C., Bubak.—Drugs may be bought of B. K. Paul & Co, 113, Bonfields Lane; Bathgate & Co, Old Court House Street and Smith Stanistreet & Co, Dalhousie Square, all of Calcutta.

2694. G. M. P., Mandla.—For analysing hair oil you may write to D. Waldie & Co., 1, British Indian Street, Calcutta.

2695. K. C. P., Jhanji.—For securing loans on mortgage write to Bengal Central Bank Ltd., Hare Street, Luxmi Industrial Bank, 80, Chowringhee Road and Mahajan Banking & Trading Co., Ltd., 71B, Clive Row, all of Calcutta. For selling silk yarns and silk goods advertise in the Sale Exchange pages of **Industry**. Your other queries being in the nature of an advertisement should not be published in these columns. For selling elephant's tusk you may write to the following ivory goods manufacturers. Matri Bhandar, 206, Cornwallis Street and G. N. Bose, 72, Harrison Road, both of Calcutta.

2696. A. S., Kandukur.—Silver market reports appear regularly in the columns of **Commercial India**, the sister journal to **Industry**.

2697. A. R., Hundal.—There are many government bulletins recording research and propagation of lac. For these copies you may write to Superintendent, Government Central Book Depot, 9, Hastings Street, Calcutta.

2698. N. J. S., Jodhpur.—An article on wool dyeing appeared in January 1925 issue. As regards artificial silk you may go through June 1924 issue of **Industry** that contains valuable information about artificial silk manufacture. An article on gold and silver thread manufacture will be found in September 1926 issue.

2699. S. C. A., Akaralkudi.—In place of ghee vegetable product is used though not equally wholesome and nutritious. No vegetable substitute of an egg is known to us. You may wash your clothes with laundry soap available in the market. Process of hydrogenation appears elsewhere in this issue.

2701. A. R. K. S., Chanda.—Your enquiries are not in our line.

2702. J. M., Ferozepur.—For industrial books enquire of Chakravartty Chatterjee & Co., Ltd, 15, College Square, Calcutta. There is no other journal similar to **Industry** in India.

2703. M. D. N., Morni.—Following are some of the leading dailies of India: Statesman, 6, Chowringhee, Forward, 19, British Indian Street and Hindu, Mount Road, first two of Calcutta and the last one of Madras.

2705. S. P. I. W., Persia.—If you go through the Music Columns of Statesman you will find the address required. Chemicals used in fireworks may be supplied by Champaklal & Bros., 72, Canning Street, Calcutta. For soap chemicals and perfumes enquire of Sikri & Co, Post Box No 2287, Calcutta and B. K. Paul & Co, 113, Bonfields Lane, Calcutta. For utilising oil obtained from mines consult an expert. Cow's milk is not available in powder form. A good recipe of Persian Sherbet will be found in April 1922 issue.

2706. N. P. L., Rohri.—A reply to your enquiries was sent by post on 30th November.

2707. R. G. H., Poona City.—Your letter addressed to the Director of Commercial Intelligence was forwarded to the Controller of Patents for taking proper steps hence you obtained reply from the latter and not from the former.

2709. M. M., Vakom.—Papers of all sorts may be bought of Ghose Brothers, 631J, Radhabazar Street, Calcutta.

Kaminia Oil

(Regd.)

Finest dressing for the Hair Delicately perfumed. Re. 1/- per bot. charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot. of $\frac{1}{2}$ ounce Rs. 2/-, $\frac{1}{4}$ ounce Re. 1/4/-, V. P. & Packing extra.

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,
P. O. Box 2082, Juma Masjid, Bombay.

2710 N. T. Perupalem—For manufacturing syrup you may go through Syrup Manufacture published from this office. Recipes for preparing morabbas, etc., in the form of fruit preserves will be found in August 1924 issue of **Industry**. Other recipes you require will be found in July 1926 issue of **Industry**. Process of preparing floral oil will be found in February 1926 issue of **Industry**. Scientific appliances you require may be bought of Scientific Supplies Co., 2031, College Street Market, Calcutta.

2711 M. J. C. Katru—It is very difficult to say which firm will take myrobalans from you. We can only give addresses of firms dealing in myrobalans in Calcutta. You may correspond with Banshidhar Dutt & Sons, 120, Khangraputty, Barabazar and Jadunath Ghor, Hukkhaputty, Barabazar; both of Calcutta.

2712 S. C. N. Sialkot—For manufacturing aluminium utensils you have to use sheet metal machinery which may be supplied by Taylor & Challen, Birmingham, England. The machinery suppliers will also furnish you estimates, etc.

2713 D. D. Mahbubnagar—For attaching motor to bicycles write to Walter Locke & Co., Ltd., 4, Esplanade East, Calcutta.

2714 R. N. S. P. Sandapet—For preparing good fountain pen ink go through Ink Manufacture published from this Office.

2716 K. R. I. Mysore—You may go through Sale and Exchange pages of **Industry** for addresses of order suppliers. You may correspond with the following mail order business houses; Pioneer Mail Supply Co., 93/3, Chive Street, and S. A. B. Bakshi & Co., 70, Colootola Street; both of Calcutta.

2717 B. S. Jhang—Use your own discretion. We cannot advise you on the line as it is beyond our scope.

2718 M. G. S. P. Sattur—For watches and clocks you may correspond with the following firms of Bombay. Abrecht & Co., Hornby Road, Cursetjee Lowasjee, Meadows Street and Madorina Watch Co., Hornby Road.

2720 B. B. Pabna—You may wash your cloth with soap or soda.

2721 K. N. R. Bombay—You may send your article to the Editor of this journal when that will be published if suitable.

2723 S. S. G. Bikaner—Passing Show cigarettes are manufactured by Carreras Ltd., 238/240, City Road, London E. C. 1. Picture post cards may be supplied by City Post Card Co., 42, Mansell Street, London E. 1, Regent Publishing Co., Ltd., 318, Euston Road, London N. W. 1, E. David, Cite Rangement 8, Paris, France, P. Racine & Cie. Boul. Sebastopol 96, Paris, France and Photo Chemie G. M. C., N. Stolpischestrasse 37, Berlin, Germany. Dyes of all sorts may be bought of Amin Chand Mehra & Sons, 34, Armenian Street and Hansraj Vishram 13, David Joseph Lane, both of Calcutta. Picture frames and glasses may be bought of Hem Chandra Chunder, 10, Swallow Lane and Fotie Lal Seal & Sons, 16, Swallow Lane, both of Calcutta.

2724 S. B. S. M. S. Rohtak—For German gramophones enquire of K. C. Dey & Sons, Gramophone Palace, Harrison Road and M. J. Shaw, 5, Dharmatala Street, both of Calcutta.

2725 C. C. Madras—Silk sarrees may be bought of S. S. Bagchi, Khagra, Murshidabad, H. Barrat & Co., Khagra, Murshidabad, and Harchand Ray Anand Ram, 207/1, Harrison Road, Calcutta.

2726 G. S. A. S. Nellore—For code book required enquire of Chakravarty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

2728 G. D. R. Shalibanda—A recipe for gold and silver polish appeared in November 1926 issue of **Industry**. Ink will keep in a fluid state if it be properly filtered at the time of

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College
USE FOR INFANTS AND INVALIDS

Manufactured by:—

AMULYA DHONE PAL,

General Merchant & Order Suppliers

Factory—Baranagar and Bariqal,

Office—113, 114, Khangrapottery St., Calcutta

manufacture Consult *Indk Industry* published by this Office You will have an idea of rubber balloons if you go through the article on making rubber balls that appeared in March 1923 issue of *Industry*. A recipe for rubber solution appeared in November 1925 Methylated spirit is largely used in the manufacture of varnishes and as a cheap solvent An electric flame is not necessary for cooking purposes Sufficient heat is generated when a current of electricity is conducted through a coil of specially made thick wire This is the underlying principle of an electric heater

2729 N V N, Madras—Gold thread is manufactured by C G Ulrich, Nachf. Neuerwall 39 and F. Voelcker Spitalerstrasse 10, both of Hamburg, Germany Kodak Cameras may be supplied by Kodak Ltd, 61/65, Kingsway, London W C 2 and Eastman Kodak Co, of New Jersey, Rochester, New York, U S A

2730 R Mufnah, 1, Hugh Low Street, Ipoh, Perak, F M S Ready made match compound is not available Match chemicals may be bought of Champak Lal & Bros, 72, Canning Street, and C C Biswas, 126, Bow Bazar Street; both of Calcutta Match Sticks and veneers may be supplied by Bhawani Engineering & Trading Co, 122/1, Upper Circular Road and Bande Mataram Match Factory, Tallygunge, both of Calcutta

2735 C C S, Amalapuram—A good recipe of lime juice glycerine will be found in October 1926 issue Cardboard boxes with artistic printing on these may be had of Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta Glass bottles may be bought of S K Dey & Son 124, Shova Bazar Street, Calcutta

2736 U N V, Mombasa—Button making machines may be had of Oriental Machinery Supply Agency Ltd, 201, Tall Bazar Street, Calcutta

2737 J M P F, Parlakumedy—No other better recipe than that appeared in October issue is available You may try the recipe now and may report any defects if found Wants to be put in touch with perfume and hair oil merchants of Ceylon

2738 M A, Kandhla.—To sell second-hand books you have to advertise in the pages of newspapers and periodicals

2740 K R, Sargodha—Punjab equivalents of gingelly are "til," "tile" and kunjad; There must be something wrong with the chemicals used or with working principle

2741 P L, Bareilly—Your enquiry is unintelligible Be more explicit

2742 J C Comilla—Optical goods may be supplied by Stevery & Co, Ltd, 275, Bow Bazar Street, and Lawrence Mayo & Co, 16, Old Court House Street, both of Calcutta Capital to be invested depends upon the scope of the business

2745 G P B, Barh—For motor lorries Enquire of Ford Motors Ltd, 110/1, Russa Road and Allenbury & Co, Ltd, 24, Park Street; both of Calcutta For securing agencies of insurance firms you may correspond with the following firms, Sun Life Assurance Co, of Canada, 12, Dalhousie Square, Calcutta; Light of Asia Insurance Co, Ltd, 6, Old Post Office Street, Calcutta, Himalayan Assurance Co, Ltd, 8, Dalhousie Square, Calcutta and Empire of India Life Assurance Co, Ltd, 28, Dalhousie Square, Calcutta The Managing Agent of Martin Railway Co, ie, Martin Co, 7, Clive Row, Calcutta For securing agency you may go through Sale and Exchange pages of *Industry*.

2747 R S D, Buba—A good formula of vinegar will be found in September 1924 issue An article on gold and silver ware appeared in September 1926 issue Good recipes of lavender water will be found in September 1924 issue. An article on harmonium building will be found in June 1926 issue

SETT DEY & Co.

**ORIGINAL HOMEO PHARMACISTS,
42 Strand Road, Calcutta.**

Dealers in Original Homoeopathic dilutions
and Biochemic Triturations
Catalogue Free On Application

2748. S. N. R., Calcutta—A good recipe of snow cream will appear in an early issue

2749. F. W. C., Bombay.—For securing addresses advertise in the pages of **Industry**.

2750. M. L., Dalhousie.—For selling honey and mustered oil you stock advertise in the pages of periodicals.

2751. S. P. K. K. M. B., Rangoon—Process of silvering mirror will be found in October 1926 issue.

2754. H. S., Lucknow—Tin boxes may be bought of Rampratap Gajananand, 6, Halsi Bagan Road, Calcutta. Cardboard boxes may be bought of H. L. Sett & Sons, 8, Nilmony Mitter Street, Calcutta

2756. C. H. A., Nowpada—For glazed earthenware pipes enquire of Burn & Co., Howrah. Galvanized iron sheets and angles may be supplied by Anandjee Haridas, 20, Darmanatta Street, Calcutta

2758. M. C. L., Patna—Addresses of querists other than those of the last two years are not available

2761. P. V. R., Salur—A good recipe of lime juice glycerine will be found in October 1926 issue. Eucalyptus oil may be supplied by K. G. Kamat & Co., Bombay No. 4. Director of Commercial Intelligence, 1, Council House Street, Calcutta will supply any commercial information you require. Fancy labels and cardboard boxes may be supplied by Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta. For particulars of industrial exhibitions to be held during the year 1927 enquire of Director of Industries, Madras. In case of non-receipt of money advanced or articles ordered seek legal advice. Recipes of good ottos will be found in September 1924, issue. Broken glasses are utilised in manufacturing inferior class glass. Recipes of stencil inks will appear in an early issue.

2762. U. D. S., Raghunathpur.—It is advisable for you to go through a manual on soap manufacture. You may go through Soap Making by Huist, to be had of Chakravarti Chatterjee & Co., Ltd, 15, College Square, Calcutta. Packing boxes and planks may be supplied by Packing Case and Timber Co, 31,

Linton Street, Entally, Calcutta. Wants supply of cotton seed oil.

2763. H. R. D., Dacca.—The address of Byabasaya O Banijya, is 8, Lall Bazar, Calcutta. For preparing syrup direct from oranges go through Syrup Manufacture published by this Office. For preserving oranges engage an expert in the beginning. For exporting betelnuts abroad you may write to M. M. Ispahani & Co, 51, Ezra Street, Calcutta.

2764. I. A. G., Thayetmyo—Your idea is unworkable as the sediments referred to by you cannot be utilised

2765. B. L. M. B., Barbara—Process of dyeing mother-of-pearl will be found in December 1924 issue

2766. A. N. V. N., Madura.—Lithographic materials may be supplied by Coates Bros Co., Ltd, St Brides House, Salisbury Square, London E. C. 4, King Paper Co, Kalamazoo, Michigan, U. S. A., and Ludwig Walter, Poststrasse 2, Berlin C. 2, Germany. Zinc, copper and brass plates may be supplied by A. Lane & Co, Oranburger Strasse 58, Berlin No. 24, Germany. The following are some of the lithoprinters of Germany, Bibliographisches Institute A. G., Tanbchenweg 17, Leipzig; Berliner Lithogr. Institute Julius Moser, Potsdamerstrasse 110, Berlin and Scidel & Naumann, Annenstrasse 24, Berlin. Leather cases may be supplied by Eccles Walker & Co, Forward Works Crescent, Cambridge Street, Birmingham, England

THE ONLY TIME TO ENCOURAGE.

SWADESHI INDUSTRY.

Purchase

KIRLOSKAR PUMPS.

Write for full particulars to Sole Agents—for India, Ceylon, etc.

K. B. JOSHI & CO.,

321, Hornby Road, Fort, Bombay,
Post Box No. 534.

Calcutta—84A, Clive St.,
Post Box No. 675

Karachi—Bunder Road,
Post Box No. 230.

Madras—Post Box No. 1260.

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices



2767. R. N. Calicut.—Wants to be put in touch with iron pan manufacturers.

2771. G. F. P., Ernakulam.—Jute yarn may be bought of Gopal Chandra Dass & Co., 74/1, Clive Street and Saligram Harbanslall, 71, Clive Street, both of Calcutta. English equivalents of Swedish words are not known.

2773. D. R. S., Dharwar.—Derby tickets are sold to no one except a member of the Royal Calcutta Turf Club, 13, Russel St Calcutta.

2774. R. S. K., Rampore.—Refer your query regarding coal to Indian Mining Federation, 7, Swallow Lane, Calcutta. Wants addresses of the agents of the following makes of cinematograph projectors, Power projectors; May projectors, Ross Projectors; Day projectors; Howarth projector; and others.

2775. B. S., Khaur.—For Government publications write to Govt Central Book Depot, 8, Hastings Street, Calcutta. You may consult Thacker's Indian Directory to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. No such directory is known to us.

2776. R. J. R., Hyderabad.—Steel is melted in a special kind of furnace prepared for the purpose. Recipes of shaving soap will be found in the last December issue. For emery powder enquire of Kailash Chandra Dutt, 20, Bonfields Lane, Calcutta. When boiling add soda silicate as an adulterant.

2777. L. M., Bejawar.—For spare parts of road roller enquire of John King & Co, Ltd, 40, Strand Road; Jessop & Co, Ltd, 93, Clive Street and Burn & Co, Council House Street; all of Calcutta. Wants to be put in touch with secondhand woollen coal dealers of Calcutta and Karachi.

2780. H. T. A., Lashkar.—The following is a list of philatelists; P. Bhima Rao, Clive Lines, Bellary; A. N. Seshagiri Rao, 282, Linga Chetty Street, G. T. Madras; The Calcutta Philatelic Mart, 46, Police Hospital Road, Calcutta, and B. R. Sunderaja Sarma & Co., Bhavangodi, Fort Trivandrum, Chalai.

2781. M. A. F., Bhopal.—For canes enquire of Hanid & Bros, Civil Lines, Bareilly and Md. Ayub Khan & Sons, 42-43, Civil Lines, Bareilly. Watches may be supplied by Hermann Konrad,

Neustadt, Block, Forest, Germany, Wehrle & Klager, Schonwald—Baden, Germany; Hamilton Watch Co, Lancaster, Pennsylvania and Western Clock Co., La Salle, Illinois; last two of U. S. A. No such machine is known to us. T. E. Thomson & Co., 9, Esplanade East Calcutta may supply the machine.

2782. M. R. D., Sialkot City.—Marble toys may be had of Agra Marble Works Co., Drummond Road; K. Bink & Sons, Gokulpura; Empire Marble Mart, 662, Drummond Road and Kedarnath Bhagwandas, Khatsa Street; all of Agra. Ornamental brass wares may be supplied by Ornamental Brass Works, Railway Road; Jafar Ali, Mohalla Nababpur; C. L. Khannah & Co, Oriental Art Emporium and Mohammad Yar Khan, all of Moradabad. Wants to be put in touch with toy manufacturers of Poona; clay toy makers of Lucknow and Patna and lion and tiger skin suppliers.

2783. M. V. R., Khammammet.—For Tin-food milk powder enquire of B. K. Paul & Co, 113, Bonfields Lane, and Smith Stanstreet & Co, Dalhousie Square, both of Calcutta.

2784. D. H. C., Karachi.—Good recipes of scarlet red ink will be found in Ink Manufacture published from this office.

2786. A. N. D., Balasore.—Sugar cane extracting machine may be had of Burn & Co, Council House Street, Calcutta. For other agricultural implements enquire of Marshall Sons & Co, 99, Clive Street, Calcutta.

2787. U. T., Bubak.—A workable suggestion has been given in the September 1926 issue of **Industry** for making Bengal Matches.

2788. O. K. M., Bahadurpur.—New motor cars cannot be had at so cheap rate. The scheme of Ford Motor Co, to establish a factory in India has not materialised. For

BIRTH CONTROL

ADVICE IN AN ILLUSTRATED PAMPHLET

Of 20 Pages containing Hygienic Practical methods approved by competent authorities is sent on application, with a

One Anna Stamp for Postage,
To the Hon. Secretary,

BIRTH CONTROL CENTRE,
29-1, Telipara Lane, P. O. Shambazar, Calcutta.

second-hand motor cars enquire of A Milton & Co, Ltd, 156, Dharamtala Street and M T Ltd, 59-60, Chowringhee, both of Calcutta. Copper can be melted by application of heat.

2790. R. J. G., Calcutta—Recipes of Zarda will be found in August 1924 issue of **Industry**. Add carbolic acid to the tooth powder in very minute quantity. A good recipe of mosquito pastilles appeared in July 1926, issue.

2791. K. R. M., Hoshiarpur—Your previous letter is not traceable.

2793. J. K. T., Calcutta—Zinc wastes cannot be utilised except perhaps by melting them.

2794. B. M. L., Jodhpur—Process of preparing leather reviver appeared in August 1926 issue. A similar process is applicable in case of gut.

2795. S. M. M. A. C., Jafna—You may use amla oil the recipe of which appeared in March 1926 issue. For bales of coats write to Hall and Anderson, Chowringhee, Calcutta. Pocket cameras may be bought of Calcutta Camera House, 158, Dharamtala Street, Calcutta. For second hand books enquire of Khalil Ahmed, 18, Shyama Charan De Street, Calcutta. Wrist watches may be supplied by L. Basack & Co., 5, Old Court House Corner, Calcutta.

2796. M. C. S., Ferozapore City—Toys and novelties may be supplied by Art Toy Manufacturing Co., Ltd, 46, Fitzroy Street, London W 1, Ennel Toy Manufacturing Co., 269 & 270, Upper Street, London No 1, Goldstein & Co., Edg, Klosterstrasse 14, Berlin, Germany, Kuhn Holm, Schutterstrasse 29, Dresden, Germany, New Toy Co., Inc., 200 Fifth Avenue, New York, U. S. A. and Fulton Specialty Co., Elizabeth, New Jersey, U. S. A. For starting business with small capital go through the Small Trades and Recipes and, New Idea columns of **Industry**. Pictures may be supplied by Kunst in Bild, Leipzig W. 6 and Anaplas Act-Ges, Hamburg 11 E; both of Germany.

2797. C. B. L., Indore.—No such institution is known to us. Cinema machines and films may be bought of J. F. Madan & Co., 5, Dharamtala Street, Calcutta. It will be advisable to start cinema-showing business in a populous town.

2798. K. N. M., Malegoan—Refer your query regarding poultry to the Secretary, Government Poultry, Faim, Etah, U. P.

2799. H. C. J., Narsinghgarh—For books on mechanical engineering and law journals enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2800. S. A. D., Amraoti—Process of preserving infusion of indigenous herbs appeared in April 1926 issue.

2801. P. B. M. B., Madras—For caustic soda please enquire of the Calcutta Chemical Co., Panditla Road, Ballygunge, Calcutta.

2803. I. M., Matara—Vegetable dyes may be had of S. N. De Post Box No 7861, Calcutta. For tin foil try C. C. Biswas & Co., 125, Bowbazar Street, Calcutta.

2806. A. P. S., Nankana—You will find good recipes for marking linen in the book of Ink Manufacture published by this office.

2807. S. S. V., Mampur, —For wooden boxes write to Packing Materials Co., 14, Old Court House Lane, Calcutta. Tin Boxes may be had of Gajanand Iron Works, 6, Halsibagan Road, Calcutta.

2808. S. R., Faridkote—For retail sale of chemicals write to C. C. Biswas & Co., 125, Bowbazar Street, Calcutta.

2810. D. H. S., Karwi. Address of all firms dealing in grains and seeds outside India will be found in Kelly's Directory of the World.

2811. J. M. P. F., Ganjam—Brass utensils of desired size may be made to order by Surendra Nath Banerjee, P. O. Khagra, Murshidabad, and Surja & Sons, Moradabad U. P. For tin pots write to Pioneer Canning & Condiment Works, Harrison Road, Calcutta.



**Cheapest House For
SPORTING GOODS
Silver Medals, Cups &
Shields.
Fine Silver Medals in
Velvet lined cases.
Rs. 3-12 each.**

**Largest Stock & Variety
Illustrated Lists Free.
CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

2812 S V R, Kistna.—For convocation regulations write to the Registrar, Calcutta University, Senate House, Calcutta. A reputable firm of tailors is the Kamalalaya, College Street, Market, Calcutta. • Messrs Ranken & Co, Ltd, 4, Old Court House St., Calcutta, are a firm of European tailors.

2813 M S Y, Pegu.—The following are importers of clocks & watches:—Anglo-Swiss Co, 7, Dalhousie Square, East, Fawcett & Co, Ltd, Norton Bldgs, Dalhousie Square, West End Watch Co, 13, 14, Dalhousie Sq, All of Calcutta.

2814 M D, Bilmore.—Wants to be put in touch with millers and bone exporters on Bombay.

• 2815 M B, Dhai.—Wants Hindi Indian Directory. For English Directory write to Thacker Spink & Co, Mango Lane, Calcutta.

• 2816 P V N, Poona.—The query is outside the scope of **Industry**. Consult a physician.

2817 I. W. S, Burma.—A recipe for Pam Balm appeared in January 1926. Wants to be put in touch with manufacturers of Italian Buttons.

2818 M S P, Mandalay.—For books on magic and appliances write to P R Janardhanam Naidu, Ongole P. O., Guntur Dt. For books on Alchemy enquire of Thacker Spink & Co, Esplanade, Calcutta.

2820 S P W, Ambala.—For pill manufacturing machine enquire of Oriental Machinery Supply Agency, 20/1, Lal Bazar Street, Calcutta.

2832 B C W, Lahore.—For books containing recipes and formulas write to Chucker-vertty Chatterjee & Co, College Sq, Calcutta.

2833 S K M, Bombay.—You can learn the techniques of export and import business if you go through articles on this subject in the earlier volumes of **Commercial India**, the sister journal to **Industry**.

2834 C S C, Baraduar.—Fancy goods may be supplied by (1) Mahomedbhoy Jivabhoj & Co, Nizam St., Bombay No 9, and (2) K G Maniar, 55/1, Camping St, Calcutta.

2835 M E, Navsari.—For the registration of Trade Marks write to Messrs P Lodge & Co, P B 6772, Calcutta. The recipes of all the

articles enumerated by you have appeared from time to time in the pages of **Industry**.

2836 I S I C, Bombay.—Please write letters to Querists 2048 and 2144 under care of **Industry** when your letters will be duly redirected.

2837 S R C, Cocanada.—The following are the addresses you want—Nib—D. R. Puri & Son, Puri Iron Works, Gujrat, (Pb) Pencil—F N Gooptu, Balliaghata, Calcutta; Pen-holder The Mysore Agency, College St, Calcutta. Eucalyptus Oil—Lokmanya Agency, Sarkari Tabala, Bombay. Soap—Calcutta Soap Works, Albert Hall, College Sq Calcutta. Ink Bottles etc.—The Calcutta Glass & Silicate Works, Belgachia, Calcutta. Rubbers—Scientific Instrument Co, Ltd, Johnstongani, Allahabad. For ringworm ointment try the advertisement pages of **Industry**.

2838 G P, Tehri.—Mango pulp is preserved by the Oriental Cannery Co, Honavar, Bombay P.

2839 N D J, Ambala.—For business directories please write to Thacker Spink & Co, 6, Mango Lane, Calcutta. You will get sight of many trade openings if you read **Commercial India** systematically.

2840 P B R, Madras.—Your requirements will be met by communicating with the Asian Exchange Club, Post Box No 357, Bombay. Cinematograph camera may be had of Messrs Bathgate & Co, Old Court House Street, Calcutta. You can arrange for a loan through the advertisement pages of **Industry**.

2841 S D S, Ramganj.—Replies to your queries appeared in January issue.

2844 U K V, Dharapuram.—Starch and talcum generally enter into the composition of toilet powders and not soap. The profit of the business will depend upon the conditions of local market. Any good starch may be used for the purpose. Ordinary alcohol may be used for dissolving colours. For orris root enquire of S N De, Post Box No 7851, Calcutta. It is better to employ precipitated calcium carbonate but ordinary chalk may be used if it be sifted through muslin. Attar is the essential oil of flowers. Otto is the English name for it; Essence is the solution of above in alcohol.

Extract is the abstract of any odoriferous substances through liquids and fats. Processes for preparing the above appeared in the last and current volumes in a series of articles. Tamil equivalents of the articles are not known. You can prepare for sale any product from any published recipe or formulas.

2845 R. S., Buxar—Your query being in the nature of an advertisement, cannot be inserted in these pages.

2846 K. S. R., Bhimavaram—Most probably the product is not properly emulsified. The supernatant water of slaked lime is to be mixed with glycerine. For machines suitable for home industry write to the Oriental Machinery Supply Agency, 201, Lal Bazar Street, Calcutta. Your remaining query is in the nature of an advertisement.

2847 K. S., Delhi—For books and appliances of block making enquire of Photographic Stores and Agency, 154, Dharamtala St., Calcutta. To learn the art you can serve as an apprentice in any establishment for block making.

2848 V. P. C., Madura—For toys refer to No. 2796 above. Cardamoms are not exported from England, France and Germany. Knives may be supplied by Joseph Rodgers & Sons Ltd., 60, Holborn Viaduct, London E. C. 1, J. W. Stutter Ltd., 173, Shoreditch High Street, London E. I., Klittermann & Moog G. m. b. H., Han C. Solingen and E. Luettges & Co., Solingen; both of Germany. Fountain pens may be supplied by Hennefer Schreibu, Fbr Ranchle & Co., Hennef a. d. Sieg and Nelson Werk, G. m. b. H., Hamburg Blankenese E.; both of Germany. Glasses for lighting purposes may be supplied by Haak Beloza, Radberg, Saxony, Germany and S. Goto Furudo Co., Awaji Cho, Kanda-ku, Tokyo, Japan. For alarms and lights used in carriages enquire of Kambei Ono, 91, Shichome, Kita Kyntaro-machi, Higashiku, Osaka, Japan.

2849 B. D., Kulkarni—It is advisable for you to consult an expert for an estimate of the capital outlay for the industries mentioned by you. On a small scale it would appear that about Rs. 25,000 will be required. There is no book on the subject. The only way to learn

its manufacture is to serve as an apprentice for a period. Hosiery machines may be had of the Indo-Swiss Trading Co., 27, Pollock St., Calcutta, who will also furnish instruction for working same.

2851. K. D. S., Rayadurg—It is not possible to light two or three electric lights with the current generated by the battery mentioned by you. Exact proportions of the ingredients of Amrutnanjan is not known as it is a patent article. You have to gild the watches again. Process of gilding appeared in 1923 issue. For books on watch repairing enquire of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. The address of Jewellers' and Watch Makers' Advertiser is 148, Great Charles Street, Birmingham, England.

2852 P. L. S., Shivpuri—You should use Teddy camera for having pictures without requiring films, plates and dark rooms. For this type of camera write to J. J. Shaw & Sons, 11/F, 287, Sandhurst Road, Bombay 4.

2853. S. G. K., Belgi—For learning homeopathy and obtaining degree by post you may write to the Principal, C. H. Medical College, 104, Cornwallis Street, Calcutta.

2856 P. P. K., Cannanore—For spring hinges enquire of Abinash Chunder Dutt & Co., Monohar Dass Chowk, 208, Harrison Road, Bara Bazar and J. C. Coomaz & Sons, 25/2, Chiv Street, both of Calcutta.

2858. K. B. R., Salur—Antimony has no special name in chemistry. Observe the capping very carefully and try to imitate. In the beginning you may not be successful but with the experience thus obtained you will be able to do it satisfactorily. Recipes of perfumes will be found in September 1924 issue. Eucalyptus oil may be had of K. G. Kamat & Co., Bombay No. 4. It is not possible to keep coconut oil liquid during winter season without mixing it with other oils such as til oil or castor oil. Recipes of summer drinks will be found in April 1925 issue. For other queries consult a physician. Electro blocks may be supplied by S. K. Bhattacharjya & Bros., 114, Sova Bazar Street, Calcutta.

2859. S. H. Ajmer—The following is a list of homeopathic colleges required by you. The Hahnemann Medical College 222-226, North Broad Street, Philadelphia; The New York Homeopathic Medical College and Flower Hospital, 63rd & 64th Streets, Manhattan, New York. Illinois Homeopathic Medical Association, 4041, N Keeler Ave, Chicago, Illinois and The Hahnemann Medical College and Hahnemann Hospital of Chicago, 2811, Cottage Grove Avenue, Chicago, all of U S A

2860 V. P. B., Madura—Refer your enquiry to the Director of Commercial Intelligence, 1, Council House Street, Calcutta

2861 K. L. K. B. L., Lucknow—For selling old coins you may write to The Travancore Industrial Co., Kayangulam, Travancore

2863 P. F. G. W., Telegaoon.—An article on Sheep Farming showing its various sides such as estimates, food and expected profits will be found in March 1925 issue. For industrial books enquire of Thacker Spink & Co., -3, Esplanade East, Calcutta

2866 L. R. L. S., Lansdowne—For cinema films enquire of J. F. Madan & Co., 5, Dharamtala Street, Calcutta. For automatic musical box enquire of Dwarkin & Sons, Dalhousie Square and K. C. Dey & Sons, 96, Lower Chitpore Road, both of Calcutta. Wants to be put in touch with importers of condensed milk of Bow-head, Sepoy and Anchor brands

2867 C. B. R., Combatores—Thank you for your good suggestion

2868 P. R. V. A., Ernakulam—You may refer your enquiry to the Registrar, Calcutta University, College Street, Calcutta

2870 K. B. Rooker—Vide No. 2390 in December issue

2871 G. H., Lahore—Your enquiry is unintelligible

2872 K. P. Tum—The following firms of Calcutta deal in Khadi—Hemprova Bhandar, 22, Cornwallis Street, Desh Bandhu Bastralaya, 21, Cornwallis Street and Khadi Pratisthan, 15, College Square

2874 N. L., Tinsukia—Corrugated iron sheets may be supplied by Broggon & Co., Ltd., 16 & 20, Upper Thames Street, London E. C. 4;

Gibbon Skinner & Co., 30, Wharf Road, City Road, London No. 1; Whitaker-Glessner Co., Wheeling, West Virginia, U. S. A.; Youngstown Sheet and Tube Co., Youngstown Ohio, U. S. A.; K. Kawai & Co., Ltd., 29, Shichome, Andojbashi Dosi, Minami-ku Osaka, Japan; Grohman & Frosch, Leipzig-Plagw Weissenfel-serstrasse 65 and Weithas, Nfge. F. Nonnenmuhlg 12; last two of Leipzig, Germany. Cement may be supplied by Hann Portland Cement Fal Act Ges. Misburg, Hanover, Germany. Vorwohler Portland Cement Fabrik Planck & Co., A-G, Warm Cuchenstrasse 22, Hanover, Germany; British Portland cement Manufacturers Ltd., 4, Lloyd's Avenue, London E. C. 3, The Associated Portland Cement Manufactures Ltd., 8, Lloyd's Avenue, Fenchurch Street, London E. C. 3, Alpha Portland Cement Co., Easton, Pennsylvania, U. S. A.; Vulcanite Portland Cement Co., Philadelphia, Pennsylvania, U. S. A.; Chiyoda Kogyo-Kaisha Ltd., Kuransai; Asakusaku, Tokyo, Japan and The East Indies Trading Co., Ltd., 55, Itchome, Hamadore, Dojima, Higashiku, Osaka, Japan. Hardwares may be supplied by Abe Kober & Co., Ltd., 50, Sanchoime, Minami Nakadori, Yokohama, T. Ariga & Co., 17, Nichome, Yokohama-cho, Nihonbashi-ku, Tokyo, Dent-Hard ware Co., Fullerton, Pennsylvania, Penn Hardware Co., Reading, Pennsylvania; General Hardware Co., 17, Union Street, Borough High Street; London S. F. 1, Alexander Robert & Co., 87, Bishops gate, London E. C. 2, Buschbeck & Heben Street, Bischofswerda, Saxony Gustav Hammel, Velbert, Rhineland, last two of Germany

2876 S. H. M. R. B., Rajganpur—To communicate with any querist write him with number and initials under care of **Industry** when your letter will be duly redirected.

ACCOUNTANCY

London Diploma Examination In December
TUITION FREE BY POST

Apply Prospectus

PAITHANKAR,

POST JUNNAR, (Poona.)

2877. G R, Kapurthala—A good recipe of a kind of face cream appeared in October issue. Process of preparing shaving soap will be found in December 1926 issue.

2878. A R 2, Gujarat—Cardboard boxes may be had of Calcutta Fine Art Cottage, 76, Dharamtala Street, Bengal cardboard Box Manufacturing Co., 64/1, Mechua Bazar Street and H L Sett & Sons, 8, Nilmony Mitter Street; all of Calcutta.

2879 C D F, Ahmedabad—An article on cheese-making will be found in October 1925 issue of **Industry**. For industrial books enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2880 G S C, Sialkot City—An article on boot polish manufacture will be found in June 1923 issue of **Industry** which you may consult with advantage.

2881 P D P S, Muttra—You may start general order supplying business. In order to have an idea of the business you may go through Mercantile and Mail Order Letters and Methods and Money Making by Mail by K M Banerjee to be had of this Office.

2883 R A M, Ludhiana—For the book required enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta.

2884 R B, Bhadli—For knitting machine parts enquire of Indo-Swiss Trading Co., 27, Pollock Street and W H Brady & Co., 26, Strand Road; both of Calcutta.

2885 J N B, Nami Tal—The term q.s. in recipes signifies "as required". The ingredients you require may be had of Banshidhar Dutt, 126, Khengraputty and Jadu Nath Ghar, Hooka Patty, both of Calcutta.

2886 R G H, Poona City—Controller of Patents, 1, Council House Street, Calcutta is the authority as regards patent.

2889 M J C, Katm—Refer to No 2711 above.

2890 C G P, Nazapatam—Gablonz glass articles are manufactured by Ehrlich Alfred, Gablonz a/N, wienerstrasse 62, P P B, 62; Proft & Co, Haida, Czechoslovakia; Walter Friandrich, Steinschonau and Wurfel & Horna, Haida.

2891 K C D C, Barisal—In order, to

rectify the brittleness of the soap manufactured by you add a little quantity of castor oil or a little wheat flour. A good formula of rosin soap will be found in December 1925 issue. A combination of castor oil and rape-seed oil will impart stiffness to soap. A combination of castor oil and coconut oil will produce softness of soap. In making soaps by cold process heat is not applied. When soap is almost complete salt water is generally sprinkled on the mass to enhance the quality of the soap produced. For starting a soap factory the following apparatuses and appliances are necessary. Soap frames, soap pans, iron tank for stocking lye, stamping machine, barring machine and Beaumes hydrometre. Try to sell soap in local market. Wants a capitalist with Rs 1000, for a soap factory.

2893 V D V, Jubbulpore—For scissors enquire of Mahomed Hajeer Aboo, 101, Cutlery Bazar, Bombay No 3, Osman Ahmed, 112, Cutlery Bazar, Bombay; H Rashid & Co, 15, Zakaria Street, Calcutta and Choonilal & Co, Bunder Road, Karachi. Wants to be put in touch with sugarcane vinegar manufacturers.

2894 S K M, Bombay—It will be advisable for you to consult Thacker's Indian Directory. For securing old copies of telephone guides of different towns of India, Burma and Ceylon advertise in the pages of newspapers and periodicals. You may enquire of Remington Typewriter Co, Ltd, Wheeler's Bldg, Hornby Road, Fort, Bombay for particulars of Romeo type-copying "Home Printer" will not be suitable for printing letters, circulars and other large job works.

2895 I P E C, Madras—Wants to buy lamb skins, lizard and python skin, bristles and fibres etc.

2898 V J K, Goa—Your previous letter has already been replied.

2900. C P C, Nagpur—There is no school for learning rubber stamp making and block-making by correspondence. You should read books on the subject. For books enquire of Chackraverty Chatterjee & Co., Ltd., 15, College Square, and Thacker Spink & Co. 3, Esplanade East; both of Calcutta. For stitching machine enquire of John Dickinson & Co, Mercantile Buildings, Lall Bazar, Calcutta.

2901 M A S, Cuddapah—Wants to be introduced to asafetida merchants

2902 S H. S, Afgarh—For German fancy curtains, picture cards, wall calendars etc enquire of (1) Indo-German Trading Co, Cocanada (2) R Mediratta & Co, Lahore (3) Mahomedabhoy Jivabhoj & Co, Nizam St, Bombay 9. Addresses of picture-cards manufacturers of Germany appeared in these columns of the last issue. Addresses of importers of picture cards will be found in the advertisement pages of **Industry**. Wants to be put in touch with manufacturers of button, ring, etc in Hyderabad (Deccan)

2904 M L D, Muttra—You can prepare the particular tobacco mixture if you go through the book on Indian Tobacco and its Preparation published from this office

2905 L H, Shikarpur—The so-called 'radio' watches are made by painting the hands and figures on the dial with the help of luminous paints—formulas of which have already appeared

2906 P C R, Nellore—For condiments you are referred to (1) Daw Sen & Co, 12, Lower Chitpur Road, Calcutta (2) Atwood Dacod & Co, Entally P O, Calcutta, (3) Indian Condiment Mfg Co, Egmore, Madras

2907 S V C, Vizianagram—For schedule of duties imposed on articles of import apply to the Director General of Commercial Intelligence, 1, Council House St, Calcutta

2909 L C M, Karachi—Collapsible tubes may be had of (1) Brooks Peel & Co, Ltd, 24, City Road, London E C 1, (2) Venesta Ltd, 1, Great Tower St, London E C 3, (3) Betts & Co, Ltd, 1, Wharf Road, City Road, London N 1. Formula of tooth paste appeared in March 1926

2910 M G A, Masarhood—To learn Homeopathy by correspondence write for particulars from C H Medical College, 104, Cornwallis Ct, Calcutta. An article on sealing wax will appear soon

2911 A M, Poona—For second-hand books write to (1) Khalil Ahmad, 18, Shyama Ch De Street, Calcutta (2) D B Taraporewala Sons & Co, Meadow Street, Fort, Bombay.

2912 P L A, Travancore—Oriental Art Wares are stocked by P Jackson Higgs 15, East, 54th, Street, New York, (2) Edward I. Faimer, 16, East, 56th St, New York

2913 T V M, Kathiawar—There is no Hindi edition of **Industry**.

2914 A H M. N K, Moradabad.—The rules relating to queries are published at the head of these pages

2915 J P L A, Travancore—Book on artificial flower making may be had of Chakraverty Chatterjee & Co, Ltd, College Sq, Calcutta.

2917 M L B, Bundi—It would be advisable for you to engage the services of a foundry man or mechanical expert to construct a suitable furnace for melting the alloy and conducting the operation

2918 N M P, Ode—Chemistry, both elementary and higher course is included in the curriculum of the Bengal Technical Institute, Jadavpur, near Calcutta. It is conducted by the National Council of Education, Bengal

2919 S S P, Arrah—Sesame and mustard oil may be purified by filtering through filter cloth. If the oil be purified by sulphuric acid it may be afterwards neutralised to make it harmless

2923 L M C, Puneah—Animal charcoal denotes charcoal obtained by burning bones of dead animals. It may be had of Kailash Ch Dutt, 20, Bonfields Lane, Calcutta

2924 R N D, Balasore—Suggestions for starting business on a small capital will be found in the New Idea pages of **Industry**. Wants to know the names of paddy purchasers of Bombay who have no paddy in Orissa. Rice mills conducted by Europeans are (1) Smison Bros Ltd, Cocanada Rice Mill, Cocanada, Godavary (2) Punea Rice Mills Co, Ltd, James Scott & Sons, Ltd, 1, Old Court House Corner, Calcutta. A complete list of Rice Mills in Madras will be found in Thacker's Directory

2925 D H S, Karwi—Wants to be put in touch with purchasers of Ghee

2928 T N V, Sandila—Addresses of firms manufacturing collapsible tubes will be found above. Card Board boxes may be had of the

Fine Art Cottage, Dharrumtolla Street, Calcutta and H L Sett & Sons, 8, Nilmoney Mitter St, Calcutta

2929 M D C, Punjab—For addresses of picture post dealers see above. A list of addresses of the watch makers of Switzerland appeared in the third volume of **Commercial India**. Other addresses will be found in Kelly's Directory of the World and Thacker's Indian Directory. For face cream see above.

2990 S S O, Punjab—Refer your queries to the Director of Public Instruction, and Director of Industry of your province.

2931 B. C, Aligarh—For particulars of a small litho press write to the Indo-Swiss Trading Co, 27, Pollock Street, Calcutta. Wants to be put in touch with manufacturers of felt hats and soaps.

2932 U N L, Basti—The process of making butter referred to by you is essentially wrong. The subsequent corrections made by us are right. There are no further amended formulas available.

2933 B L S, Jhang—Your queries are outside our scope. For books on occult science write to Chakraverty Chatterjee & Co, College Sq, Calcutta.

2934 J P S, Palamau—Chemicals may be supplied in retail by K L Dutt & Co, 79, Manicktolla Street, Calcutta.

2936 H S V, Manbin—For books on Tobacco curing & Cigarette making enquire of Thacker Spink & Co, Esplanade, Calcutta.

2939 E V U B, Palai—Addresses of Importers of and dealers in stationery goods throughout India will be found in Thacker's Indian Directory. For ruling and cutting machines apply to Ashutosh Addy & Co, 16, Lower Chitpur Road, Calcutta.

2940 K G S, Ganjam—The book on Fire-works by Thomas Kentish may be had of Chakraverty Chatterjee & Co, College Sq, Calcutta.

2943 J K B, Birbhum—Recipes for Zarda and surti will be found in the book Indian Tobacco and its preparations published by this office.

2944 J P W, Bharatpur—For photographic materials try The Calcutta Camera House 158, Dharmatalla Street, Calcutta. For brush making machinery please inquire of T E Thomson & Co, Esplanade, Calcutta.

2946 M. B S C, Vizianagaram—For alizarine dyes you are referred to (1) Mohanlal Dosabhai Dave, 269, Raminad Road, Madura (2) Mohammadali Alibhoy & Co, 44, Armenian Street, Calcutta.

2951 M L S, Patiala—Metcolized wax being a trade article its recipe is not known.

2952 I W C, Jullundur—On 5th August last one pound sterling was equal to 25 14 Swiss francs.

2953 A R, Moradabad—For securing old and rare books in Persian, Arabic and Urdu advertise in the pages of newspapers and periodicals.

2954 N M N, Nadiad—Tablet-making machines may be bought of Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta. Glass bottles and phials may be had of S. K Dey & Co, 124, Shova Bazar Street, Calcutta. You may advertise in the pages of **Industry**.

2955 M M A. R, Tum—Glass phials of required description may be bought of C K Das & Sons, 17, College Street, Calcutta. For eucalyptus oil enquire of K G Kamat & Co, Bombay No 4.

2956 S B L, Cawnpore—Your enquiry appeared in October issue of **Industry** under Trade Enquiry column under No 2329. Gauge of wire denotes certain specifications of the wire regarding weight, thickness, etc. As for example iron wire of 24 gauge will measure .023 inch in diameter and weigh 0.140 lbs. per 100 ft.

2958 R S D S, Jhelum—Ropes may be supplied by Turner Morrison & Co, 4, Council

BOSE & COMPANY

General Order Supplier & Dealers In:

All sorts of Canes, Bamboo Root Polo Balls & Raw Products & etc. The best house for placing orders. If you are in need of anything please to book your order with

BOSE & COMPANY,

28 Ram Rattan Bose Lane, Shambazar, Calcutta.

House Street, Calcutta Shalimar Rope Works Ltd, Shalimar, Howrah and W H Harton & Co, 8, Canning Street, Calcutta.

2959. C C S, Amalapuram—Recipes of lime juice glycerine appeared in April, July and October 1926 issues of **Industry**. Recipes of pomade and face powder will be found in September 1924 issue. A good recipe of face cream appeared in July 1924 issue. Formulas of marking ink will be found in September 1923 issue. A good recipe of pain balm appeared in January 1926 issue. Recipes of hair curling lotion appeared in September 1924 issue. The same issue also contains recipes of hair lotion. Recipes of hair oil will be found in September 1924 issue.

2961 V L V C, Ettimadai—An article on vermicelli making appeared in January 1925 issue.

2962 F C, Bezvada—For selling woollen carpets in large quantity you may advertise in well circulated newspapers.

2964 S C, Ambala City—Enquiry letters are not generally replied by post unless they are accompanied by 4 annas stamp to meet the preliminary expenses.

2965 D N S, Sibesar—In railway workshops allowances are generally given to the apprentices so that they can meet their expenses. So you may try to be apprentice in a railway workshop.

2966 C A A, Nellore—Refer your query to All-India Astrological & Astronomical Society, 370, Upper Chitpore Road, Jorasanko, Calcutta.

2970 K D M, Delhi—For cinema enquire of Pathe Cinema Ltd, Pathe Bldg, Ballard Estate, Bombay and J F Madan & Co, 5, Dharamtala Street, Calcutta. Cinema machines may be supplied by the latter firm.

2971 V J C, Bombay—You should advertise for selling the concerns under your management.

2973 M G N, Cochin—For making brushes of various types you may read books on the subject that may be supplied by Chakraverty Chatterjee & Co, Ltd, 15, College Square, Calcutta.

2974 V M S S, Sattur—You should either read books on the subjects or try to be an apprentice in workshops where engraving, stereotyping, etc are carried on. For cigarette making machines enquire of Oriental Machinery Supply Agency Ltd, 201, Lall Bazar Street, Calcutta. Aluminium powder may be bought of Kailash Chandra Dutt, 20, Bonfields Lane, Calcutta.

2976 B C D, Moibong—Questions of any kind within the scope of **Industry** is published free of charge.

2977 J R C, Chittagong—Soap colours may be had of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Glue may be bought of Banshidhar Dutt & Sons, 126, Khengraputty, Calcutta. Wants to buy soap-stone.

2978 K N S, Sonand—Homeopathic medicines may be supplied by Boericke & Tafel, 145, Grand Street, New York, U S A; Boericke & Runyon, 200 Sixth Avenue, New York City, U S A, Dr Willmar Schabes Homeopathic Central Pharmacy, Leipzig, Germany and Keene & Ashwell Ltd, 6, South Molton Street, London. For learning Homeopathy and obtaining degree by correspondence you may write to Bombay Homeopathic Medical College, 18/20, Kalbadevi Road, Bombay, The Hahnemann Society 60, Lamington Road, Bombay and C H Medical College, 104, Cornwallis Street, Calcutta. For other recipes you want please consult a physician.

ALWAYS MIND ECONOMY AN HOUR'S WORK IN A FEW MINUTES



This is a Wonderful Automatic Hand Machine, for quick, smooth, invisible **WEAVING** in any fabric. Saves endless time and trouble. Repairs any size hole in Stockings, Underwear, Coats, Pants, Sarees, Dhories etc. Silken, Woolen, or Cotton. Quite simple a child can use it. Sent with illustrated directions. **Price, Rs. 1-14-0. Post Free V. P. P.**

**The NOVELTY MART,
BOMBAY No. 3.**

**No Home should be without One.
Nearly 5000 Already In Use.**

2979 M K N, Pollachi—Match splints and veneers may be supplied by Sundarban Match Factory, 12, Dalhousie Square and Tollygunge Match Factory, Tollygunge; both of Calcutta

2980 S S S, Etawah—For the book required enquire of Thacker Spink & Co, 3, Esplanade East and W Newman & Co, 4, Dalhousie Square East, both of Calcutta. Wants to be put in touch with old woollen coat and overcoat dealers

2981 L W T, Pymmana—For strings used for musical instruments enquire of E. Calral & Son, Kalbadevi, George and Alexander, Freire Road, James Manufacturing Co, Kalbadevi; all of Bombay

2982 D J C, Cochin—Wooden types may be bought of Bharat Chitralaya, Upper Chitpore Road, Calcutta

2983 S U T A, Srinagar—Deitz lanterns are manufactured by R E Deitz & Co, New York, U S A. Lanterns may be supplied by Carl RiecksSohne, Neheim-S, Hermann Nier, Beirfie-i-sa, Frohlich & Wolter, Beierfeld, Sachsenand Brennerund Metallwaren Aktien gesellschaft, Nordbahustrasse 17, Berlin-Pankow; all of Germany. Tracing cloth may be supplied by Richard Schwickert G m b H, Froburgi Brg, Germany and National Tracing Cloth Co, Saylesville, Rhode Island, U S A. Hosiery goods may be supplied by I M Pezoldt, Stadtsteinach, Bavaria, J Winkler, Chemnitz, Melanchthonstrasse, 29, Germany and Horikawa Shoten Ltd., 10, Nichome, Hon-cho, Nihonbashiku, Tokyo, Japand Imanaga & Co, 2, Chome Tsurigane-cho, Higashiku-, 6 Saka, Japan. Other addresses you want appeared several times in these columns

2984 A S N S C, Hassan—Carpets are manufactured by Beni Ram Uttam Chand, Raja Mandi; Agra Carpet Factory and Otto Weylandt & Co, all of Agra

2985 M. H A. K, Hyderabad—For books on chemistry write to The Book Co, Ltd, 4/4A, College Square; S C. Auddy & Co, 58, Wellington Street and R. Cambray & Co, 15, College Square; all of Calcutta.

Notices & Reviews.

Stationery Articles.

In spite of the fact that the market is flooded with cheap carbon papers and typewriter ribbons there is always room for things of the right type. We allude to the "Kleenlege" Brand ribbons, and papers manufactured by Messrs Fairquhaison Bros. Ltd., of Great Britain, which can hold their own against odds in respect of quality and price. These products are held in stock by the Indian School Supply Depot 309, Bow Bazar St, Calcutta from whom we have received some samples for testing

Paint Remover.

Described as the perfect paint remover, "Rubowar" is a new product prepared by Messrs Norris & Co, 158 Cornwallis Street, Calcutta. Its application which is a simple affair easily removes old paint, varnish etc, from the surface of wood, metal and the like

Incense Sticks.

Forget-me-not Dhups made by The South India Supply Agency, Mysore emit delightful aroma on being lighted. These incense sticks are of different kinds, such as Aguru, Sandal, Musk etc.

Bhattacharjee's Tea.

One of the oldest firm of tea dealers in the local market are Messrs Bhattacharjee & Co, Ltd, 64/1, Cornwallis St, Calcutta. The quality of their tea has become well nigh a standard

Honey.

Honey is a house-hold necessity and in ordering Himalaya Stores, Kasauli Hills for it one may be sure of getting a stuff of exceptional purity.

Jeevarasam.

Messrs Jeevarasam & Co, Karaikudi, S. India have sent us a phial of their homeopathic medicine Jeevarasam, which is claimed to cure many diseases

Chokher Alo.

Chokher Alo (Light of Eyes) is a specific for eye complaints and may be had of Mr A Dutt, 57, Clive Street, Calcutta.

Rasraj Pills.

As a remedy for indigestion and dyspepsia Rasraj Pills are prepared by Navjivan Pharmacy, Wazirabad, Punjab.

Tea & Coffee.

It is with deep satisfaction that we testify to the superior quality of tea and coffee produced by the Nectar Tea Factory, Mettupalayam, Nilgiris and we have no hesitation in recommending the same to our readers.

A Dental Medicine.

An anti-pyorrhoea remedy may be had of Messrs A Rams & Bros, 132, Wattgun, Ludhiana. It is easily applied on gums.

Hair Oil.

Messrs Mukherjee Bros, 17/19, Shambazar Bridge Road, Calcutta are the agents for Brojo Bilas Taila—a nicely scented hair oil. They have favoured us with a beautiful tricolour calendar.

Dadh-Jeevan Calendar.

From the Dadh-Jeevan Depot, Lashkar, Bawalior, we have received a calendar for 1927.

Eau-de-Cologne.

Judging from the sample of Eau-de-Cologne made by The Sardar Chemical Works, Motiwala Buildings, Elphinstone Road, Post No 13, Bombay, it appears to be of high grade quality and as such is quite satisfactory.

Otto Madhurani.

"Madhurani" is the name of a delightful concentrated essence prepared by Messrs James Nelson & Co, George Town, Madras. It has a sweet and pleasant fragrance which is lasting.

A Technical Primer.

Prospects of Oil Industry in India by Banesvar Dass, B S Ch E, Jadavpur, Near Calcutta.

One of the anomalies of recent times is that while India produces a huge quantity of oil seeds there is no oil industry worth the name in this

country. Mr. Das has shown succinctly how such an industry can be built up with great advantage and financial gain. He has drawn attention of the Indian industrialists and capitalists to the lucrative business that can be earned on in oil which has so many industrial applications. As an instance in point the so-called vegetable product or artificial ghee can be easily manufactured with immense profit from cotton seed, groundnut and other oils.

A Business Journal.

Money Making Monthly The Experimenter Publishing Co, Inc, of New York Agents in India, Ramsankar & Co, Kottar.

The most unique feature that strikes one is that the pages of this journal literally bristle with money making opportunities. There is an incomparable wealth of new ideas which can be easily put into practice for earning money. Besides there are copious hints and suggestions for starting successful business. Those who wish to better their prospects will find it immensely useful.

Date Calendar.

Our thanks are due to the Advertising Art Studio, Opposite G. P. O., Bombay in respect of a serviceable date calendar.

We acknowledge the receipt of a very fine calendar with the picture of the Goddess of Health from The Hygeia Homeo Pharmacy, Anarkah, Lahore, Pharmacutists and Publishers.

Pocket Calendar.

With compliments of Messrs M N S and Sons, Paper Merchants & Book Binders, Lansdowne Building, Mysore, a very useful pocket calendar has come to our hands.

Eight calendars have been received from The Bindhannce Medical Hall, Kemmendine, P. O., Rangoon.

Calendars.

We have thankfully received a pictorial calendar from Messrs Ghassi Ram & Sons, Chandni Chowk, Delhi.

Messrs Rajabaidya Ponnada Bhaskaram & Bros, Proprietors Medical Hall, Rajahmundry, have sent us a calendar for 1927.

We are in receipt of a large wall calendar with bold types from the Deccan Printing Works, high class printers, 609, Sadashiv Peth, Poona city.

TRADE ENQUIRIES.

[To communicate with any party write him direct with name and address given below, mentioning **Industry.**]

2809. Baldeo Dass & Sons, 49, Biru Well, Meerut.—Wants to be put in touch with manufacturers of and dealers in "mellowa" oil

2821. N. Piraisoodumperumal Pillay, Kottar, Travancore.—Desires to be introduced to dealers in "loral" oil and cake and coconut oil and cake.

2850. M N Ponshe, Wardha, C P.—Wants to be put in touch with wholesale dealers of essence of Khair tree

2921 Kyaw-Hla & Son, 32, Bombay Avenue, Mandalay—Desire to be put in touch with manufacturers of crosses and other emblems

2926. Padmasey Jettabhai, Asher's Bldg, Tirupur.—Wants to be introduced to Kapok cotton dealers of Calcutta

2941. Pundit K D Jha, P O Chandanpati, Muzafferpore.—Wants to be put in touch with exporters of **dhatura**, **sambal**, cotton, **ak** cotton, tamarind, nux vomica and beeswax

2963. A. Shah, Khusrro Bagh Road, Rampur State, U. P.—Wants to be put in touch with dealers in beeswax, honey and babool charcoal.

2989. The General Clearing and Forwarding Agency, Cochin—Can supply fresh salted crocodile skins.

3000. K. P. Sinha, Divisional Transportation Supdt., G I P Rly, Jubbulpore—Wants to be put in touch with fresh and dried fruit dealers of Rawalpindi and Peshawar

3031 The Kohinoor Confectionery Works, 184, Rampart Row, Karachi—Desire to be put in touch with sago, flour dealers

3038. Thachil Varkey, Angamali—Wants to be introduced to silk braid manufacturers of Mysore.

3041. S R. S Peterson, C/o Post Master, Grand Road, Bombay.—Desires to be put in touch with manufacturers of Ceylon hand bags for ladies made of date-tree leaves

3042. Nirmal Chandra Datta & Bros, Mokam Bheramarah, Dist. Nadia.—Can supply

betel leaves and all kinds of grains and country products.

3050. Badri Prasad Baboo Lal, Lala Bazar, Almora.—Desires to be put in touch with dealers in "bisatikhana" articles at Karachi, glass-sheets and golden picture frames.

3060. R. A. Shanbhag, Chitrigi, Kumta, Dist. N Canara—Wants to be introduced to wholesale seller of betel nuts in Calcutta.

3126. L. Balajee Rao, Coimbatore—Requires addresses of textile printer of Farrukhabad.

3132 R. C. Agarwal, The Chemical Co., Dhar, C. I.—Can supply thymol oil in large quantity

3286 Commercial Products Syndicate, 44/1 Beadon Row, Calcutta. Can supply linseed oil, cotton seed oil, mohwa oil and their cakes in very large quantities.

FEBRUARY ISSUE OF INDUSTRY

(In the Press.)

The February Issue of **Industry** which will be published by the end of the month will contain instructive articles on Industrial uses of Petroleum, Orange Cultivation etc., in addition to the usual feature such as Small Trades and Recipes, Formulas and Processes, Queries and Replies. Any friend of our subscriber may get a sample copy free on application to the Manager

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows.—

Indian Rs 3/-

Foreign Rs 5/4/-

The charge is for complete yearly volume only, inclusive of postage. V. P and Registration fees are separately charged.

BUSINESS NOTICE.

* **Industry** is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book post on receipt of the value of the V. P. P. particulars and Advt. rate please write to—

Manager **INDUSTRY OFFICE**,
Shambazar, Calcutta.



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THE CURES OF UNEMPLOYMENT:

Mr. M. Viswanadham of Madras writes under date 3rd December, 1926. "Having taken the V. P. containing the two books (1) Money Making by Mail and (2) Mercantile & Mail Order Letters & Methods, I have gone through the same three times thoroughly,.....and must admit I am benefited by them to a considerable extent and I sincerely trust that many a young man who complain of unemployment, will do well not to miss these two gems."

Mercantile & Mail Order Letters and Methods.

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Requirements of a Modern Letter
Scope of a letter.
Technicalities of a letter
General Form
Building up of the letter
The Subject matter
The Arrangement
Characteristic of a modern letter
General Classification
Form or Routine Letters
Enquiry Letters and Answers
Complaint Letters & Adjustment
Mail Order Salesmanship
Suitable Business
Publicity
Advertising in the Press
Advertising by Post
The Mailing List
The Catalogue
Procuring Orders
Forcing Future Business
Selling Service
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The Follow-up
Letters to Dealers
Educating the Agents
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And 50 Model Letters

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Money Making By Mail

SUMMARY OF CONTENTS

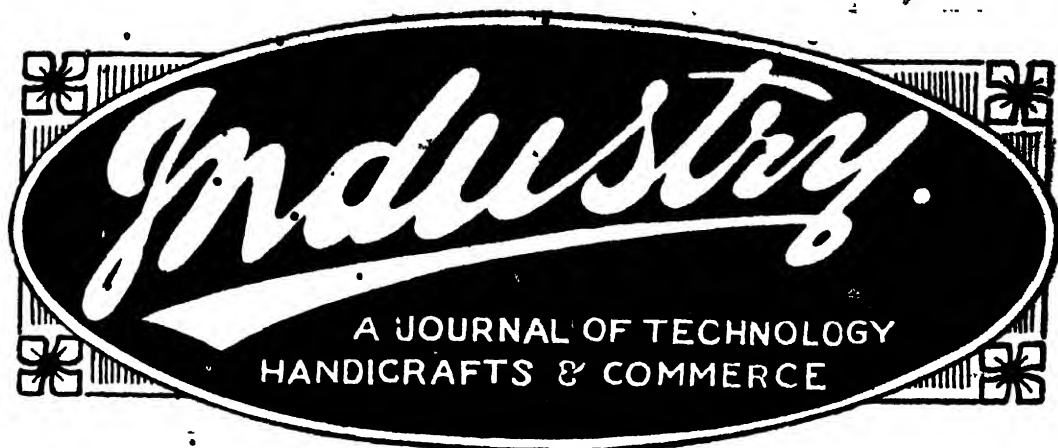
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Eighteenth Year Souvenir

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THIS IS A HUMBLE TOKEN—MERELY A SOUVENIR.

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INDUSTRY teaches every man to be self-made and self-reliant. It teaches work which is difficult in proportion as the end to be attained is high and noble. God has put the highest price upon the greatest worth. If a man would reach the highest success he must pay the price himself. There is no road to success but through a clear, strong purpose. A purpose underlies character, culture, position, attainment of whatever sort.

**"To be thrown upon one's own resources is to be cast into
the very lap of fortune." FRANKLIN.**

Industry closes the seventeenth year next March and commences a new volume in April. The April issue will be sent to every subscriber by V. P. P. and it is expected that those who are not willing to accept the V. P. P. should write us in time.

WITH WHOLE-HEARTED GOOD WISHES

INDUSTRY OFFICE,

KESHUB BHANBAN, SHAMBAZAR, CALCUTTA.

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What a part has **INDUSTRY** played in the story of Indian Business Success! Not once, Nor twice, but many times year after year Businessmen testified how they had overcome slump in the market and even loss and found way to success through the advertising pages of **Industry**. It thrills us to hear these stories of business success. They will thrill you also. Below we give only a few:—

The German Novelty Store, Lahore, Writes on 15-2-27—"I am receiving many orders and enquiries from your paper **"INDUSTRY"** for which I always recommend my other friends to give advertisements in your paper, I can say this that among, all the Monthly Journals there is only **Industry Paper** from which I always get many orders and enquiries more than I do expect, this is the only reason that I always send advertisement to this paper."

Mr. D. K. Sathe, 83 Budhawarpath, Poona, writes on 28-1-27—"I have given my advertisement in your Magazine only two times and I found your Magazine most effective—more than other papers...."

Mr. P. R. J. Naidu, Ongole, writes on 24-1-27—"I am advertising in **Industry** for many years, and I have a great desire to continue the advertisement. Those who wish profit should advertise in **INDUSTRY**."

The Continental Textile Stores Co., P O Box 770, Bombay, writes on 22-1-27—"... Looking to the services that are being rendered by your magazine (**Industry**) we admit it surpasses all other magazines in the whole of India."

Mr. A. P. Kodaisia, BSc, F R. S (London), Chief Forest Officer, Bansda State, writes on 28-1-27—"Among the Commercial papers of the day in India, I am of opinion that **INDUSTRY** heads the list. It is a real friend of tradesmen. I often give my advertisement in it and the results I always find most effective."

Messrs Rukmas & Co., Post Box 99, Lahore, write on 28-1-27—"I placed a very small advertisement... but I received orders to the value of about Rs 600/- from all parts of the country."

South India Supply Agency, Madras, writes on 15-1-27—"The first advertisement besides paying for itself has brought about many enquiries and still bringing many more...."

Knowledge Office, 24 Waverley Mansions, Calcutta—writes on 24-1-27—"....I am pleased to say advertising in **Industry** has been very beneficial to me as I have received enquiries from all parts of India and also Africa."

Messrs C. S. Man & Co., Lyallpur, writes on 3-2-27—"We regard the **INDUSTRY** as an extremely valuable journal for advertising purpose. We should tell you frankly that we have received most favourable results from our advertisements published in **"INDUSTRY"** compare with those which were published in other papers and magazines charging very high rates."

Dr. T. N. Sharma Kaviratna, Gujrat, Punjab, writes on 29-1-27—"I am satisfied for the last two years for my advertisement in **INDUSTRY**. Certainly there are very few magazine in India which can give such results."

Messrs Alladin & Sons, Alladin Buildings, Oxford Street, Secunderabad, write on 31-1-27—"I have the pleasure to state that my advertising in your magazine proved more effective in comparisons, than my advertisement elsewhere."

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1. Every issue of the Magazine is being keenly awaited by thousands of readers all over the country

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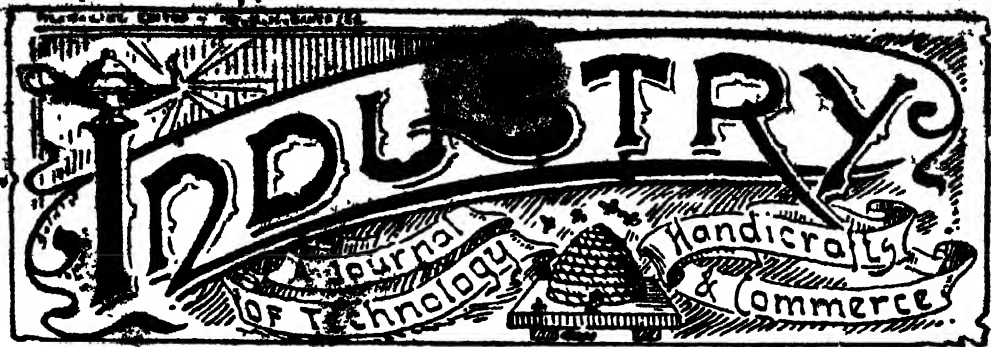
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VOL. XVII.

CALCUTTA, FEBRUARY, 1927.

NO. 203.

PAY HEED TO THE HUMAN MACHINE.

WHEN a machine is allowed to remain idle it becomes rusty and it takes quite a while to get it into proper running condition again. The best prescription for keeping it in good shape is to run it frequently and see that it is well lubricated. It will run more smoothly and quietly in high gear than it will in second speed.

Much the same rule applies to the brain. Keep it working and give it plenty of grease in the form of thought food. The busy mind works more efficiently and accurately than the idle one which applies itself only occasionally. We can all recall our own experiences along that line. With plenty of spare time on our hands some small job which needs our attention seems very large and we dread starting it. We are apt to continue putting it off, and when we do take hold of it, we do it in a half-hearted way which does not produce efficient results. We do not turn out the finished piece of work which we would have on a busy

day when we had to find time to do it in. It is just the difference between a cold engine which has to be cranked up and got running and one which is already warmed up and running smoothly.

Idleness of brain breeds laziness of mind. If you allow your brain to acquire the habit of loafing it will reach a state where it resents being put to work. The antidote is to give it plenty of thought material to keep it busy.

Coming to the sphere of business, cultivate alertness for it will bring you sales. Alertness in a measure is natural to some, but it can be cultivated by any body, and one of the most important preliminaries to the cultivation of alertness is the appreciation of the value of it. The industrialist who is ambitious, energetic and observant will succeed. He must work towards his ambition, and be quick to grasp the opportunities which will land him there. Observation is the key-note of success in life.

THE USES OF PETROLEUM AND ITS PRODUCTS.

PETROLEUM and natural gas have been employed in a primitive manner as sources of light and heat from the earliest times. The use of the crude oil for the treatment of wounds and cutaneous affections, while of equal antiquity has been even more general. The latter application may indeed be said to have been at one time universal, for it appears from the accounts given by historians that, as a remedial agent, petroleum was carried to distant countries from the localities where it was found and was thus a not unimportant article of commerce.

For pharmaceutical purposes crude petroleum is no longer in general use by civilised races, but, as is well known, the product vaseline is very largely employed, both alone and as a vehicle for the external application of medicinal agents, especially when local action, rather than absorption, is desired. The physical and chemical characters of vaseline, indicate the superiority of this product over animal fat for such purposes.

Vaseline forms a good protective coating for the surface of oxidisable metal, and as such is used to a very considerable extent. The volatile product of petroleum termed rhigolene has been found to be a valuable anaesthetic, particularly for local application to produce cold.

The paraffin candle has so completely superseded the old tallow dip, and the beautiful translucent candles of white paraffin manufactured now-a-days in many artistic forms are so commonly

employed, that it is unnecessary to point out how important the solid hydrocarbons contained in petroleum and shale oil have become to the candle maker. Paraffin of low fusing-point is also burned in specially constructed lamps.

As illuminating agents the liquid products of petroleum are used under various conditions. The most important of these products, commercially, is kerosene, but both the more volatile and the less volatile are also largely employed in suitable lamps. Petroleum products and crude petroleum constitute an important source of light in their employment for (1) the production of "air gas" or carburetted air, (2) the manufacture of oil gas and carburetted water gas, and (3) the enrichment of coal-gas. For the first of these purposes gasolene is needed; for the second, crude petroleum, various petroleum-products, and shale oil are available—the liquid hydrocarbons being converted into permanent gas of high illuminating power; while for the third, either oil-gas or the vapour of the sufficiently volatile hydrocarbons is required.

The petroleum stoves employed for heating and cooking are practically lamps of suitable construction, in which mineral oil is burned.

Petroleum residuum (ostatki) and the heavier distilled petroleum oils have to a certain extent replaced solid fuel on steamships, in locomotives and in stationary boilers, as well as for various industrial operations, and rapid developments of the use of petroleum, in this direction will in the near future play an

important part in the economic progress of many countries.

Petroleum-products also constitute an important source of power in connection with motors of the gas-engine type, and the use of these in most forms of autocar, has created an enormous demand for petroleum spirit. The vapour of petroleum spirit is in one form of motor, employed similarly to steam.

The very general and increasing substitution of mineral oils for fixed oils and greases in the lubrication of machinery and the rolling stock of railways indicates the importance of this application of petroleum products.

The more viscous descriptions of mineral oils have been found specially suited for use in the Elmore process of ore-concentration by oil.

Paraffin is used in the manufacture of wooden matches in the place of sulphur, the combustibility of the wood being increased by saturating it with the melted material, and it has been applied as a thin coating to the heads of matches to render them water-proof.

In Java, paraffin is employed by manufacturers of coloured textile materials in tracing designs on the fabric before it is immersed in the dye. It has been used for lining beer barrels, and is employed for glazing frescoes and paper, for saturating gypsum and fluorspar before turning them in the lathe or otherwise shaping them into ornaments, and in starching linen, to produce a gloss. Of recent years, paraffin, as well as mineral oil, has been used in foundry work, as an auxiliary to soap, on account of its detergent action. Paraffin is also

employed as a preservative for stone and wood, and it forms a good protective coating for the labels and stoppers of bottles used for corrosive liquids. It is used for preserving eggs and may be similarly applied as a preservative coating to meat, fruit, and flowers. Refined ozokerite is employed by French perfumers as a substitute for lard in the process known as "enfleurage," the almost entire solubility of the hydrocarbon in alcohol, and its non-liability to become rancid, giving it a great advantage over the animal fat. Paraffin forms an excellent electric insulator.

The possibility of obtaining from petroleum anthracene, certain sulphonated compounds of considerable tinctorial power and other substances available for use in the preparation of dyestuffs, has been demonstrated, though the processes have not been carried out commercially.

ORANGE CULTIVATION.

ORANGE is the name of one or more species of Citrus, of which the fruit is much prized. Although botanists generally regard all the oranges as of one species some authorities make the Sweet orange and the Bitter orange distinct species. From a remote antiquity it has been cultivated in India and thence it seems to have spread into Western Asia and Europe.

The common orange or sweet orange is an evergreen tree of moderate size with greenish-brown bark; the leaves oblong, acute, sometimes minutely serrated, the leaf-stalks more or less winged, the flowers white, the fruit

roundish, the oil-cysts of the rind convex, the juice sweet and acid. It is cultivated in almost every part of the world of which the climate is warm enough, but succeeds best in the warmer temperate or sub-tropical climates, as in the South of Europe, where it is extensively cultivated.

The Bitter orange is distinguished from the Sweet orange by the more truly elliptical leaves, the acid and bitter juice of the fruit and the concave oil-cysts of its rind. Its branches are also spiny, which is rarely the case with the sweet orange. The varieties in cultivation are numerous. The bitter orange is generally cultivated for medicinal purposes. Its chief use, however, is for flavouring puddings, cakes, etc., and for making marmalade.

Orange-leaves are feebly bitter, and contain a fragrant volatile oil, which is obtained by distilling them with water, and is known in the trade as Essence de Petit Grain. Orange-flowers yield, when distilled with water, a fragrant volatile oil, called oil of Neroli, which is used in making Eau de Cologne and for other purposes of perfumery. The flowers both of the sweet orange and of the bitter orange yield it, but those of the bitter orange are preferred. Dried orange flowers, to be distilled for this oil, are an article of export from the South of Europe. They are packed in barrels, and mixed with salt. The dried flowers have a yellowish colour; the fresh flowers are white and very fragrant. The small green orange, from the size of a pea to the size of a cherry, which fall from the trees, both of the sweet orange and the bitter orange when the crop is too great to be brought to maturity, are carefully gathered and dried, and are sold as "Orange berries." They yield a fragrant oil on distillation, the original essence de petit grain. The dried and candied fruit of the ripe bitter

orange, well-known as "orange-peel", is used as a stomachic, and very largely for flavouring puddings and articles of confectionery. The rind of the sweet orange is sometimes employed in the same way but is inferior. A fragrant essential oil is obtained from the rind of the orange by distillation with water, and is sold by perfumers as Oil of Sweet Orange, or Oil of Bitter Orange, accordingly as it is obtained from the one or the other although the two kinds of oil are very similar. Besides the use of the sweet orange as a dessert fruit, and as a refrigerant in cases of sickness, its juice is extensively used as a refrigerant beverage and is valuable in febrile and inflammatory complaints.

The fruit of the orange tree is of great commercial importance, for not only is it one of the most delicious and wholesome of fruits, but fortunately it is also the most easily kept and carried from place to place. No fresh fruit possess in the same degree as the orange and its congeners, the lemon, citron, lime, etc., the property of being easily packed in boxes when nearly ripe, and being in that state able to stand the close confinement in long transportation. Orange for trade must not be quite ripe; those fully formed and with the colour just turning from green to yellow are chosen.

Orange peel, or the rind of the orange, is used both in medicine and in confectionery—for the former purpose it is merely cut into long strips, and dried; for the latter it is carefully separated either in halves or quarters, from the fruit, and after lying in salt water for a time, is washed in clear water, and then boiled in syrup of sugar or candied, and is sold extensively as candied peel. The rinds of the citron and lemon are treated in the same manner. The wood of the orange tree is yellowish white and close-grained. It is used for inlaying and for turnery.

NATURAL RESOURCES OF BURMA.

AGRICULTURE.

AGRICULTURE affords the main means of support to nearly 70 per cent of the population of Burma and is the subsidiary occupation of a further portion of the community. Cultivation is regulated more by rain fall than by the conformation of the surface of the soil.

Lower Barma claims nearly two thirds of the cultivated area and of this six-sevenths is devoted to the cultivation of rice. In Upper Burma only half the cropped land is under rice. The remainder is made up of a great variety of field crops, such as millets, maize, pulses, sesamum, jowar, cotton, beans, wheat, and gram etc.

Rice, however is so universally grown as to be overwhelmingly the largest crop. It is grown wherever there is sufficient moisture and land in any way adapted to its cultivation. Sometimes it is raised to the exclusion of other and apparently more appropriate crops. Thus it is that Rangoon is beyond comparison the largest rice port in the world.

Cultivation in Lower Burma is easy and monotonous. The rice is sown in June, transplanted in September and reaped in December or January.

The soil is very rich and scarcely any manure is needed.

In Upper Burma, however, it is all different. There the system of rotation of crops is in vogue and double and mixed cropping are quite common.

The permanent cultivation everywhere is called Le or fields: rice fields being universal. The following agricultural implements are employed. Tun or Tundon, a harrow rather than a plough; Kyandon, or Kyanbaung, a clod crusher; Pauktu, a large hoe; Tewin, a long, narrow spade like a ditcher's; Sutpyin, a kind of sledge, drawn by bullocks.

The irrigation system in the dry zone and in the hills has been working excellently from old times. In Upper Burma the canals and irrigation weirs were very carefully kept. There are also a good many reservoirs.

All these irrigation works are in the interests of rice, infinite varieties of which are recognised, viz., red, white, green, yellow and black kinds. These again are subdivided into those with rough or smooth grain and husk, long or short, round or flat.

The Burmans have various names for paddy-growing soils such as muddy, clayey, loamy, sandy, crumbly etc., etc.

In many places, especially in the hills, water is raised by lift; of which there are four common kinds.

In the hills, what is known as terrace cultivation is adopted. The valleys and the hill slopes are cut down into terraces and rising in steps: a stream is diverted and flows from the higher to the lower terraces. In the hilly parts dry cultivation is common. The staples grown under this system are rice, maize, millets, cotton, buckwheat. Indian corn, sesamum, peas and beans, tobacco and a variety of gourds and

garden crops. In the more open lawn-like country the system is, however, different.

Generally speaking, the holdings are small. In the dry zone, however, large farms are found. The occupancy rights of a holding rest entirely with the proprietor. The Burman is much attached to his land and is loathe to part with it.

Almost all cultivators have cattle of their own and do all their agricultural work themselves, but in a few districts where there are large holdings both labourers and cattle are occasionally hired.

SPECIAL CROPS.

The chief special crop is tea. This is most extensively and best cultivated in the Northern Shan States; there is also a good deal of cultivation in the Katha district.

Very great quantities of opium are produced in the Shan States, chiefly beyond the Salween, and along the Chinese border. In Kokang, the poppy is the chief crop.

Cotton is not now so much grown as it was in former days, particularly in Lower Burma and in the more accessible parts of Upper Burma. In the hills very many tribes still grow their own cotton, and the women still clean, dye, spin and weave their own and men's clothes, and a great deal of raw cotton is exported to China.

Burma cotton is the same as that grown in most parts of India. Cotton is still sown principally on hill clearings, on the poorest class of soil and often mixed with paddy.

Throughout the dry zone the toddy palm is a feature of the landscape and the tapping of this useful tree affords employment to a large section of the people.

Other supplements of the main occupation of growing rice are the planting of betel gardens or groves of areca palm, the growing of sugar cane, plantains and occasionally orchards, besides a great variety of garden crops.

Among other products may be mentioned chillies, pumpkins, gourds, onions etc. Mango trees abound specially in the neighbourhood of Mandalay. Prome has been famous for its custard apples; Pineapples are cultivated in immense quantities in the neighbourhood of Rangoon. Oranges of good quality are grown in Amherst and elsewhere.

FORESTS.

From the point of view of the forests, Burma may be roughly divided into three parts, viz., (1) the Plains, (2) the Dry Tract, and (3) the Hills.

(1) The Plains include the deltas and the valleys of the great rivers and their tributaries draining Burma.

(2) The Dry Tract is bounded on the east by the foot hills of the Shan Escarpment and on the west by the outlying hills of the Arakan Yoma and the Wuntho Hills.

(3) The Hills cover the remainder of the country. It is the largest division.

The forests may be conveniently classified as:—I. Evergreen, comprising (1) littoral, (2) swamp, (3) tropical, (4) hill or temperate; and II. Deciduous,

Coffee has been successful in Toungoo District. Sann hemp is grown to a considerable extent in Tavoy. The forests abound in other fibrous products, comprising (1) open, (2) mixed and (3) dry.

In the evergreen forests may be found tall trees side by side with canes, bamboos, etc. Two main divisions of evergreen are met with. The most typical trees of the tropical evergreen are the huge Kanyin; Thingan, different species of figs. The hill evergreen forest is similar. The soil there is completely covered with shrubs and bushes while the branches of the trees are wrapped in mosses and orchids. India-rubber is found to the north of Burma.

The Coniferous forests occur above 6000 ft. Tinyu, Merkusii, Khasya, etc. are the pines well-known. The mixed deciduous forests cover vast areas in Burma and contain most of the trees of economic and commercial importance, forming the huge forest wealth of Burma, such as teak, Padauk, Pyinkado.

For administration purposes the forest area of the Province may be classified under two heads—"reserved" forest, which are specially demarcated and protected and whose produce remains entirely at the disposal of Government after satisfaction of the demands of right-holders, and public forest lands, which are freely drawn on for trade to agricultural requirements. The timber trees of Burma may similarly be divided into two classes, "reserved" and "unreserved." The first includes teak and is Government property. While all other trees are included in the latter.

These meet the domestic and agricultural requirements of the people.

Teak is the only species in which an export trade of importance has been developed. Besides teak there is a flourishing trade in what are known as jungle woods such as Thitya, Ingyn, etc. Bamboos and canes are also exported to the large towns for building huts.

MINERAL WEALTH.

The greater part of the as yet discovered mineral wealth of Burma lies in the Upper portion of the Province. Grains of gold are found in practically every stream of the country. Much is found in the Upper Irrawaddy, and the sands of the Salween are full of it. In fact gold is present over very wide areas and gold-bearing quartz even has been found in several places. The streams east of the Salween have the reputation of being the richest in dust.

Silver is found in quite a number of places and the mines in the Wa Wa States are particularly rich.

Coal has been found in a great many places in different parts of Burma in the Shan States, on the Chindwin River, and near Mogaung. The coal is of fair but not of peculiarly good quality. Coal is also found in the Southern part of the Mergui district and in Thayetmyo. This coal is of the same quality and character as the Chindwin coal.

Two different sorts of petroleum occur in Burma. That in Akyab and the Kyankpya districts of the Arakan division is limpid, and is like sherry in colour and fluidity, varying from pale to dark, usually with a peculiar opaline tint. The oil from Yenangyaung is thick in

consistency and dark in colour, and is very rich in paraffin wax. Petroleum is also extracted in Arakan.

Next to petroleum, rubies form the most valuable mineral product in Burma. They are found in a variety of places such as at Nanyascik, in the Myitkyina district in the stone tract of the Sagyin Hills, in the Mandalay district, and in small quantities in a few other places.

What is known as jade in Burma, is not the true stone or nephrite. Properly speaking it is jadeite. The chief quarries of this stone are at Tawmaw. Jadeite occurs in masses of closely interwoven crystals which account for its great hardness. The best material is often found in the form of nodules and pebbles in the gravels of the Uyu River.

Burmese amber is also distinct from the ordinary succinite (fossil resin). The mines are situated in the Hukawng Valley to the north of Myitkyina District. Burmese amber is a little harder than that of Prussia.

Tin is found frequently. It occurs in a belt running from the Chinese province of Yunnan down to the Malay States. Tavoy and Mergui are celebrated for the ores.

Iron is found in many parts of the hills, and is quarried in shallow, open cast pits in many places. Lead, copper and antimony are also found in various places. Albaster is mined from the

quarries at Sagyin north of Mandalay. Mica is extracted in several places while steatite mines are worked in the Minbu District.

Salt boiling is carried on along the sea coast. Most of the salt is, however, extracted from the fields, the soil of which is saturated with brine. Among the manufacturing districts may be mentioned, Lower Chindwin, Sagaing, Shwecho, Myingyan, and Yamethin districts.

Mogok is the head-quarters of the ruby-mining area of Upper Burma. The richest oil-bearing tract of Burma lies in the valley of the Irrawady. Iron smelting is a purely local village industry as well as the production of salt.

Hot springs are found all over Burma and in very many parts of the Shan States. The water in almost all cases is perfectly clear, with a beautiful tinge in any quantity. There is frequently a strong smell of sulphuretted hydrogen. The salts consist of sulphate of lime and magnesia, with traces of alkalies, principally potash. The water is highly beneficial in cases of chronic rheumatism and gout. Tourmaline, rubellite, or scharl is found in Mong Mit and Monghong, north and south of Ruby mines respectively. Tourmaline has, however, the disadvantage of being soft. Argentiferous galena is found in many places. These silver-lead mines also occur in the Southern Shan States.

VITAMINS OR THE VITAL FOOD ELEMENTS—II.

Importance of Vitamin B.

THE importance of Vitamin B to men and to animals is obvious. In fact birds and poultry have been found specially sensitive to the shortage of this vitamin.

Dogs, goats, pigs and monkeys have also been found more or less susceptible. Probably there are many cases of infantile beri-beri and perhaps adult cases too, owing to deficient and unsuitable feeding, but are not, for one reason or other, properly diagnosed as such. The table of substances (given below) rich in Vitamin B or anti-beri-beri element, the use of which in proper quantities should cure these symptoms, will be regarded with interest.

1. Rice polishings or rice bran.
2. Under-milled or unpolished rice
3. Wheat flour (wholemeal) and grain.
4. Potato (whole)
5. Beans, dried.
6. Barley, whole and not peeled
7. Rye flour
8. Milk.
9. Yeast.

Scurvy & Vitamin C.

Scurvy, also known as the sailors' disease has now been proved to be due to want of fresh vegetables and can be cured by the addition of lemon juice—which is rich in Vitamin C—or other fresh and green vegetables like cabbage etc., but not dried vegetables.

The usual symptoms are a feeling of great fatigue not dissipated by sleep; there is headache and a general disinclination to exertion of any sort. At

an early stage there are shifting pains in the joints and lower limbs and are sometimes wrongly diagnosed as rheumatism. Gums are almost always affected.

Infantile Scurvy is quite common, specially in poor and improperly fed children. In fact if we are to believe the doctors and workers in this branch, cases of latent scurvy are by no means uncommon in big cities. The first indication are digestive troubles and "almost invariably there is a marked pallor intensified by blue rings round the eyes." The child becomes fretful and may have swellings of the lower limbs.

Such cases have been successfully treated by giving undiluted fresh cow's milk thickened occasionally with sieved potato and a table-spoonful daily of orange juice. Tomato juice and swede turnip juice were found equally successful among some famine stricken children.

The most important thing to remember in this connection is that the anti-scorbutic substances must be fresh and in the case of leaves and vegetables must not be over-cooked.

Substances rich in Vitamin C.

1. Lemon Juice.
2. Cabbage leaves.
3. Lettuce.
4. Germinated pulses.
5. Raspberries.
6. Strawberries.
7. Tomatoes.
8. Oranges
9. Dandelion.
10. Horse-radish.
11. Parsnip.
12. Kohlrabi.

13. Watercress.
14. Swede turnip.
15. Coconut milk.

Minimum daily quantities for man.

Cabbage raw	0.6 oz.
Cabbage cooked (boiled $\frac{1}{2}$ hour)	3.3
Lemon juice	1.0
Orange juice	1.0
Swede turnip juice	1.6
Preserved lemon juice	3.3
Germinated lentils	3.3
" peas	3.3
Lime Juice (fresh)	6.6
Carrot juice	13.3
Grape "	13.3
Apple "	13.3
Banana	13.3
Raw meat juice	13.3
Milk	3.5 pints.

Rickets & Vitamins A. & D.

Rickets is another terrible disease to which those people who do not use dairy products are very susceptible. Rickets is not only a disease of the bones but affects the entire system. Bow legs and bow knees are very common, the chest wall is distorted and the children often suffer from tonsils. It also renders the children very liable to catch Broncho-pneumonia, tuberculosis and other infectious diseases. The curative effect of cod liver oil in such cases was long known, but the active or the preventive substance is not the oil itself and is found in butter, milk and eggs as well, for it is of vegetable origin.

According to Dr. Still, an exclusive use of any of the following diets for some time may lead to this disease.

(a) Very starchy food, bread, potato, biscuits, or cornflour with little milk.

(b) Excessively diluted cow's milk whether fresh, condensed or dried.

(c) Patent cereal foods.

(d) Breast milk supplemented by starchy food.

(e) Breast milk alone.

From whatever cause the disease may have arisen it is amenable to treatment by cod liver oil and to a slightly lesser degree by eggs, butter and milk cheese.

The following table gives the comparative value of various articles as a protective against this disease.

(1) PREVENTIVE.

Cod liver oil.
Whole milk
Butter

(2) SLIGHTLY PREVENTIVE.

Olive oil.
Peanut oil
Cotton seed oil

(3) NO POSITIVE ACTION.

Oatmeal
Rice
Orange juice
White bread
Vegetable Margarine

Artificial Vitamins.

Is it possible to prepare artificial vitamins? The answer is—to some extent. It has not been possible to prepare vitamins themselves but substances, and apparently very cheap and common substances, when exposed for some time to sun's rays or ultra-violet rays—"irradiated" as the term is—acquire vitaminous properties. Cotton seed oil,

for instance, when so treated acquires anti-rachitic properties and behaves like diluted codliver oil. Inferior food-stuffs have their properties enhanced in the same way. All substances however cannot be so irradiated. But nature has so widely disseminated this vitamin in the green leafy vegetable world that there would be little need, if at all, of resorting to such artificial methods.

I think I cannot close this article in a better way than by giving a list of some of those articles which are rich in all the vitamins and by including which in their dietary the readers of this magazine may feel themselves quite relieved on this point.

FOODSTUFF.	A	B	C
Cabbage fresh	2p	p	3p
" cooked	p	p	2p
Potato	p	p	2p
Pulses, germinated	p	2p	2p
Cereals	p	2p	2p
Cow's Milk, whole (raw)	2p	p	p
Carrots	p	p	p
Tomatoes	p	p	3p
Oranges	p	p	3p

(Plummer.)

p Denotes merely the presence of vitamin

—By Mr. J. L. B.

As you think, you travel; and as you love, you attract. You are to-day where your thoughts have brought you; you will be to-morrow where your thoughts take you. You cannot escape the result of your thoughts, but you can endure and learn, can accept and be glad. You will realise the vision of your heart, be it base or beautiful, or a mixture of both, for you will always gravitate towards that which you, secretly, must love. Into your hands will be placed the exact results of your thoughts; you will receive that which you earn; no more, no less. Whatever your present environment may be, you will fall, remain, or rise with your thoughts, your vision, your ideal. You will become as small as your controlling desire; as great as your dominant aspiration.

THE DYEING OF CHROME LEATHER.

AFTER tanning, the leather is washed in the drum with warm water at 30° to 40°C. in order to remove soluble salts. Then it receives a drumming in borax, using 2 per cent. on the leather weight. If necessary this can be replaced by sodium bicarbonate or carbonate, hypo or alkali silicate. This will neutralise any remaining acid in the leather, which is necessary in order to avoid defects in dyeing and fat-liquoring. Neutralisation can be controlled by means of the litmus paper test, a cut in the leather only turning a blue paper slightly pink, and not red. The leather is next carefully sorted, defective grains being put aside for blacks, and perfect grains used for fancy colours.

GENERAL NOTES.

Chrome leathers are dyed with acid, basic, and substantive (direct) colours. Rarely, however, is only one class of dye used, and usually acid or direct colours are employed in conjunction with a basic dye, this latter being used in a second bath. The only exception is with blacks, because some very good direct chrome leather blacks are now obtainable.

Acid and substantive colours dye chrome leather direct, although the combination is not particularly fast. On the other hand, basic colours will not dye chrome leather unless the latter is previously mordanted, the mordants usually employed being 2 to 4 per cent. of sumach or gambler. Sumach gives the leather a pale yellow colour, while gambier produces a brownish-yellow shade. Sumach should therefore be

used when very bright shades of colour are desired. The dyeing is nearly always done in the drum. Fat-liquoring of chrome leather is usually done after dyeing, but if only acid colours are used the fat-liquoring can be done first.

DYEING WITH ACID COLOURS.

The leather is put into the drum with water at 50°-60°C., and the drum started in motion. The dye solution is now added through the hollow axle. The quantity of dye needed is 1 to 3 per cent. on the weight of goods, according to the particular dye used and the shade desired. After a quarter hour's drumming, formic acid to the extent of 50 per cent. of the dye weight is run in, and drumming continued for a further quarter hour. The goods are then carefully rinsed. Fat-liquoring can be done before or after dyeing, but if done after it is best to use sulphonated oil emulsions, because soaps are liable to alter the shades obtained with acid colours.

DYEING WITH DIRECT COLOURS.

Dyeing with direct colours is carried out in the same way as described for acid colours, with the exception that no acid is required in this case. Fat-liquoring is done after dyeing. Direct chrome leather blacks are very extensively used now, and it is an advantage to combine logwood in this dyeing to shade off the black (Logwood alone gives a dark reddish-violet on chrome leather.)

DYEING WITH BASIC COLOURS.

The leather is put into the drum with water at 40°C., and, after starting up, a solution of gambier or sumach is run in, or a mixture of both can be used. Mordanting will take about half an hour.

The goods are then rinsed free from adhering tanning material.

For dyeing, the leather is put into the drum with 150 per cent. of water at 50°C., and the drum set in motion. The dye solution is run in in three portions at intervals of ten minutes each. After thirty minutes the goods are rinsed ready for fat-liquoring. This could be done in the dye liquor, but as this is usually very much cooled down, it is better to run off at least a half of this liquor, and add hot water to bring the temperature up again to 50°C. The fat-liquor is then run through the axle.

MIXED COLOUR DYEING.

The neutralised leather is put into the drum with 100 to 150 per cent. of water at 50°C., and while revolving the gambier or sumach liquor run in through the hollow axle. After quarter of an hour the acid or direct colour solution is added. When the goods have been dyed for half an hour the dye liquor is run off, the leather rinsed, the fresh warm water admitted. The basic dye liquor is added, and after thirty minutes' drumming the leather is ready for fat-liquoring.

Another method for producing blacks is to first of all dye in the drum by means of a blue, violet, or black, according to the desired colour of the flesh side. After fat-liquoring, the leather is horsed up overnight, struck out, and dyed on the grain by hand. The dye liquor for this is prepared with direct or basic black at the rate of 10 to 15 gms. per litre—that is, 1½ to 2½ oz. dye per gallon.

—THE LEATHER WORLD.

Small Trades & Recipes.

Staining Ivory Red.

A simple method is to place the pieces for twenty four hours in 10 per cent. solution of acetic acid containing one to five parts of aniline red of the shade which will match the other pieces. The ivory must first be cleansed from all traces of greasiness, and for this purpose should be immersed in benzene for some little time and in no part of the operation must the pieces be touched with the fingers; forceps should be used.

Pharaoh's Serpents.

Ammonium sulphocyanide is used in the so-called Pharaoh's eggs. The powder is made into a mass with weak tragacanth mucilage, rolled into pills and dried.

Essence of Coffee.

Essence of coffee is a highly concentrated infusion of coffee prepared by percolation with boiling water, gently and quickly evaporated to about $1\frac{1}{3}$ or $1\frac{1}{4}$ of its bulk, and mixed with a thick aqueous extract of chichory and syrup of burnt sugar, so as to give the whole the consistence of treacle. The proportions of the dry ingredients should be—coffee, 4 parts; chichory 2 parts; burnt sugar (caramel) 1 part. It should be kept in well corked bottles in a cool place. This preparation is very convenient for making extemporaneous coffee.

White Ink for Rubber Stamp.

The following is a recipe for a white ink for use with rubber stamps: Grind together very carefully 2 oz. of zinc white with 1 oz. of glycerine; when the mass is homogeneous add 1 oz. of methylated spirit.

Hair Lotion.

Resorcin	1 dr.
Castor oil	2 dr.
Balsam of Peru	$\frac{1}{2}$ dr.
Oil of geranium	10 min.
Oil of lavender	10 "
Alcohol	45 per cent. to 8 oz.

Castor Oil for Hair.

Castor Oil	15 fl. oz.
Alcohol	3 " "
Oil of Nutmeg	30 min.
Oil of Rosemary	10 "
Oil of Sweet Marjoram	10 "
Oil of Neroli	10 "
Oil of Rose	20 "
Tincture of Musk	1 fl. dr.
Alkanet	q. s.

Hair Tonic.

Resorcin	5
Tincture of Capsicum	15
Castor Oil	10
Alcohol	100
Oil of Roses	q. s.

INDIA'S INDUSTRIAL PROGRESS.

Broadcasting in India.

A broadcasting company for India has been definitely organized under the name of the Indian Broadcasting Co., (Ltd.,) with an authorized capital of Rs. 540,000. It intends to establish two broadcasting stations, one in Bengal and the other in the Bombay Presidency. Each station will be of 12 kilowatts capacity and will cost approximately Rs. 2,00,000, while the annual operating expenses are estimated at about the same figure. Under ordinary conditions it is expected that the stations will have a radius of 250 miles and under favourable conditions 500 miles. The company will receive 80 per cent of the value of broadcasting receiving licenses issued and 10 per cent of the import value of all wireless receiving apparatus and accessories brought into the country.

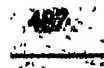
Irrigation Developments.

The two most important pieces of development work in connection with agriculture at the moment are undoubtedly the construction of the Sukkur Barrage at Sind in the Bombay Presidency, and the extension of irrigation in the Sutlej Valley in the Punjab. Sind is an important province, 47,000 square miles in size and carrying a population of nearly 4,000,000. It is estimated that there are 13,000,000 acres of cultivatable land. At the present time 2,250,000 acres are irrigated by inundation canals, which is not the best method, being wasteful. The Sukkur Barrage is still in the course of construction, but should be opened in 1929 or 1930, when some 6,000,000 acres will receive water—that is to say 3,500,000 acres additional to what is being farmed to-day. To-day

50,000 tons of cotton are being produced yearly, and provided the land can be properly colonized within a reasonable time, there is great promise from this area of a yield of 200,000 tons of cotton; including a considerable proportion of the American type.

Organization of Handloom Industry and Trade.

The imperative necessity of re-organizing the industry and trade of the scattered cottage industries has now been universally realised as one of the prime factors in the economic rebuilding of India. With this observation the textile expert to the Government of Bihar and Orissa makes some plausible suggestions for the organisation of handloom industry and trade. For, next to agriculture, weaving is the most important and extensive industry of the primary society members. The success of the modern factory industries is mainly due to efficiencies and economies possible to mass production and the facility and profits of distribution secured by the standardization of their goods. The men employed in cottage industries especially the weaving class, buy their raw materials individually from their Baniyas or Mahajans, and sell their finished goods to these same local monopolists or in the local hats. The disadvantages of such an organisation are obvious and the appalling poverty, disintegration and economic helplessness of our artisans, is the obvious result. Impelled by a desire to help these cottage workers especially the weavers, the co-operative Departments in the different provinces of India start credit societies and weaver's stores; but their attempt do not seem to have been crowned with success anywhere.



SCIENTIFIC AND TECHNICAL TOPICS.



A New Dye.

A new dye, called neo-cyanin, that may prove extremely valuable to astronomers in photographing hitherto invisible infra-red rays, has been developed recently by a great American photographic concern. The ordinary photographic plate is sensitive only to blue light and the shorter invisible ultra-violet rays. It can therefore be sensitized to other colours by the use of dyes.

The new dye makes it sensitive to light rays of 1-22,000 of an inch, while the longest rays possible to the naked eye are 1-30,000 of an inch. Plates treated with the new dye may prove a great aid to spectroscopy, for the spectroscope shows the light and dark lines in the invisible infra-red region of stars that hitherto the astronomer has been unable to distinguish clearly.

Utilising Scrap Leather.

An American scientist has been conducting a series of experiments in connection with the utilising of scrap leather, including old shoes. Recently he gave a demonstration of his process by which he hopes to turn leather into a material, the market value of which ranges as high as \$144 per lb.

The new process involves the destructive distillation of the leather scrap. This consists of heating the

scrap in retorts and collecting the volatile substances that are expelled. By this treatment the leather is decomposed into a char, a distil and a gas.

The process is thus somewhat similar to distilling coal for coke, coal tar and illuminating gas. The scrap for this purpose is classified according to the tannage—that is, into vegetable-tanned, mineral-tanned and oil-tanned leathers. This is easily accomplished, for nearly all sole leather is vegetable-tanned, and most upper leather is chrome-tanned. Moreover, any kind of scrap can be used irrespective of its tannage, shape or size.

The gas which is evolved is combustible and is used as fuel to heat the retorts, thus effecting a saving. The char is, of course, animal charcoal and should find use wherever animal charcoal is desired, such as in the purification of sugar solutions, decolorisation of gelatine and glue, deodorisation of edible oils and fats, and so forth.

The scientist claims he has obtained the following from scrap leather:—Animal charcoal; chrome oxide green (one of the most valuable permanent green pigments); sal ammoniac (used in the manufacture of batteries); two types of photographic developers; pyrrole (a base for certain valuable drugs, including iodol, an iodine antiseptic; indole, a perfume base, and pyrrolidine (the parent substance of nicotine); a type of illumi-

inating gas; and half a dozen other materials of lesser value.

Wonderful Camera for Air Survey.

The latest method adopted for air survey is by aerial photography, and the camera employed for this purpose has some remarkable features. Nothing more unlike the usual conception of a camera could well be imagined. With a single loading, one hundred exposures can be made automatically at exactly the right interval of time so that consecutive pictures match correctly to form a continuous strip of map from 100 to 500 miles long. Further, on every photograph is recorded the exact hour, minute, and second of exposure, the height at which the aeroplane is flying, the angle of inclination to the ground beneath, a serial number, the scale, type of aeroplane used, date, and in fact all the information likely to be of assistance for surveying or map-making.

Machine That Reads the Mind.

Extraordinary claims are made for a new instrument, the "dianoscope," invented by a Berlin scientist.

It is said to register mental development and capacity with such accuracy that it can be employed to determine the career for which a person is best fitted.

The "patient" sits in front of an apparatus having the appearance of a wireless set without valves or crystal. A metal rod, connected to the machine by wires, is held in the hands, while a specially devised band is clamped over the head.

The current is then switched on and the operator proceeds to pass an electrode over the sitter's head and face. By establishing electric contact with the

different nerve centres of the brain the apparatus registers the mental reactions of the sitter, the complete record being made in half an hour.

By comparing the results charted by the machine with the sitter's answers to certain questions relating to his personal ambitions and leanings, it is said to be possible to give definite advice on the part in life the sitter is best equipped to play.

Interior of Earth.

According to an English scientist, who has just completed a series of exhaustive investigations into the subject, the Earth is built on a principle similar to that of the old-fashioned metal-cored golf ball, with the addition of several layers of a lighter substance and a very thin surface crust.

The metal core of the Earth, according to this authority, is pure iron, or an alloy of iron and nickel, having a thickness of not less than 4,200 miles. The distance from the outer edge of this core to the surface is about 1750 miles; this is divided into three layers. Next to the core itself is a mixture of iron and rock, extending to within 800 miles of the Earth's crust. On top of this is a layer of rock similar to that scattered about the surfaces, but containing a much larger proportion of magnesia. The surface crust, about thirty-five miles in depth, consists almost entirely of granite.

This new knowledge of the Earth's formation has been obtained mainly through studying the velocity of earthquake waves as they pass through the Earth, as well as by an investigation of the contents of meteorites, which are generally accepted as being similar in composition to that of the Earth.

FORMULAS, PROCESSES & ANSWERS.

Manufacture of Portland Cement.

3110. S. V. S., Madura.—Wants to know how Portland Cement is manufactured.

There are three main stages in the manufacture of Portland Cement: (1) grinding and mixing the raw materials; (2) calcination of mixture; (3) grinding of clinker.

The mixing and grinding of raw materials may be done either by the dry method or by the wet method. In the first method, the rock is first crushed to a maximum size of 2 inches diameter stored in bins, analyzed, and then mixed with other rock or clay to the necessary proportion. The mixture is then conveyed to a rotary cylinder 40 to 50 feet in length, slightly inclined from horizontal, and heated to a sufficient temperature to drive out moisture. The mixture then goes to a ball mill and is grounded so as to pass through a 30-mesh sieve. After grinding, the mixture goes to the Tube Mill or Griffin mill where it is ground so that 90 per cent. will pass through a 100 mesh sieve. The fine powder is next conveyed to rotary kiln and calcined, leaving the kiln usually in small lumps. The calcined material, called "clinker," is then sprayed with a small stream of water or cooled by air blast. The final stage is the grinding of the clinker into fine powder by combinations of grinding machines of various types.

Mills producing cement from marl and clay generally make use of the wet or semi-wet process. In this case the mixture is made by adding water to the finely ground materials and agitating the mixture in mechanical mixers or pugging machines, after which the raw material is fed into the upper end of the rotary kilns. These are longer than the kilns used in the dry method, and require about 50 per cent. more fuel. The grinding of the clinker is the same as in the dry method.

Milk Powder.

3110. D. K., Indupur.—Writes, please describe in detail the process of making milk powder.

For the manufacture of milk powder, pure, clean, and fresh milk should be chosen.

The milk is first of all thoroughly cleansed of any impurities, that may have got into it through carelessness or inadvertance, by passing it through separators.

The next process is pasteurisation of the milk. It is then passed to the vacuum pan and reduced to 12° Bc which equals specific gravity 1.088. The reason for taking part of the water out of the milk in vacuo is that a certain amount may be removed at less cost than by passing it through the hot chambers.

From the vacuum pan the milk is carried to the various drying chambers

called "units." Each unit has its separate chamber and pressure pump. The drying chamber is a tiled room about 9 ft. square, heated with hot air to a maximum temperature of 766.5, and into which the milk is sprayed through an aperture about 1/10th millimetre in diameter or about the size of the point of a needle at 100 atmospheres pressure. This spray is enveloped in a current of hot air drawn from a battery of steam pipes encased in insulated boxes. An exhaust fan draws filtered cool air through the heated boxes and discharges it into the heated chamber.

The moment the fine particles of spray come into contact with the hot air the moisture is immediately absorbed and carried off, and the solids of the milk fall to the bottom of the boxes. To prevent loss of any milk with the expelled moisture taken from it, the hot air passes through a series of light cloth filter, which detain the powder but allow the moist air to escape. A shaking motion frees the meshes of the filter from powder, which falls into a receptacle below.

The milk powder so produced is minutely fine and completely soluble in water, whilst the natural fat in the resulting solution in water is in a state of almost perfect emulsion similar to that of normal fresh milk. By the above process the albumen of the milk is retained in its normal form and the enzymes of the milk are not destroyed.

There is no doubt that milk powder produced by the spray process, correctly carried out, is vastly superior in solubility and flavour to that made by other sys-

tems which involve the heating of the milk to a minimum temperature of 100°C in order to procure desiccation—a temperature sufficiently high to cook the albumen of the milk, destroy the enzymes, and, partially, caramelize the sugar.

Waterproofing Boots & Shoes.

2972. M. L. Podar.—Asks, "How to make leather shoes waterproof?"

For waterproofing boots and shoes put some best wax in a jar, well cover with castor oil and stand on the hob till the wax melts. Stir, and allow to get cold, when it should look like dubbing; if it is too thick add more oil. Now warm it again, and while soft apply to the leather with a stiff brush. Warm the boots before a slow fire, then give a second coat. If desired, a little lamp-black or gas black can be added. The oil dries in and helps to waterproof, and the wax forms a coating through which water does not penetrate.

Soldering Jewelled Ring.

3030. K. D. S., Bellary.—Requires hints on soldering jewelled ring.

In order to prevent the bursting of the jewels of a ring whilst the latter is being soldered, cut a juicy potato into halves and make a hollow in both portions, in which the part of the ring having jewels may fit exactly. Wrap the jewelled portion in soft paper, place it in the hollow, and bind up the closed potato with binding wire. Now solder with easy flowing gold solder, the potato being held in the hand. Another method is to fill a small crucible with wet sand,

bury the jewelled portion in the sand, and solder in the usual way.

Nickel-Plating Without Battery.

3033. D. J. D. S.; Colombo.—Asks whether non-electric nickelling is possible and how.

To deposit a coat of nickel on the surface of another metal (without the aid of a battery, it is necessary to have a solution or paste of a nickel salt containing an acid that will dissolve a portion of the metal to be coated at the same time as it sets free some particles of metallic nickel. There must be chemical action on the metal, and a decomposition of the paste by an interchange of metal. The coat will, therefore, be weak and unreliable. It will also be very thin, because all action of the free acid ceases when a thin coat has been deposited. Copper may be coated thinly with nickel and sodium. A coat of nickel may also be obtained in any nickel-plating solution by attaching a lump of zinc to the article being plated thus making them a pair of electric elements, and contaminating the solution with zinc. Fictitious coats of nickel have also been secured from an amalgam of mercury.

Cement for China and Glass.

3112. L. S. R. G. Etawah.—Wants some recipes of cement for China and glass.

There are many cements for repairing china and porcelain. For large articles, plaster of Paris may be stirred into a clear solution of gum arabic. This should be used immediately, but is useless if the vessel to be mended has to

hold water. A cement which is said to stand both heat and water is made by calcining and grinding oyster shells. These are then reduced to the finest powder possible with a muller, and the whole is beaten into a paste with the white of an egg. In using this preparation the broken parts should be pressed well together. A good cement for repairing broken glass is made by placing in a wide-mouthed bottle a small quantity of glue, just covering it with water, and allowing it to stand over night; next day the excess of water is poured off and the glue is covered with methylated spirit. The bottle is then placed in a pan of water and heated until the glue is melted, then a little whiting is shaken into it, the bottle removed from the pan, cooled and tightly corked. Sometimes a small piece of gum mastic, together with some ammoniacum is added to such cements. Another useful cement for the purpose can be made as follows. Cover $\frac{1}{2}$ oz. of gelatine with strong acetic acid and, after standing, melt it down by placing the bottle in hot water. Both these cements are ready for use if they are placed for a few minutes in hot water. Another cement for glass, etc., is made by coagulating milk with acetic acid and washing the casein in water. It is then dissolved in a cold saturated solution of borax, and a clear solution obtained, which is mixed with finely powdered quick-lime. This should be applied to the broken parts quickly, and the whole bound tightly with cord and gently heated. A sulphur paste for porcelain is made with sulphur, 7 parts; white pitch, 5 parts; bleached shellac, 1

part: glass meal, 7 parts; gum elemi, 2 parts; bleached shellac, 1 part: glass meal, 7 parts; gum elemi, 2 parts; and mastic, 2 parts. A very strong solution for glass or porcelain may be obtained from casein dissolved in a soluble silicate of soda or potassium.

Plate Polish Powder.

3156. N. S. J., Bombay.—Wants recipes for plate polish powder.

Polishing powders for metal are numerous and among these may be mentioned whiting, powdered rotten stone, powdered bath brick, Tripoli powder, powdered pumice stone, putty powder (oxide of tin), powdered emery, powdered oxide of iron (colcothar), crocus rouge, calcined magnesia, bone dust, etc. The polishing agent must be reduced to a state of impalpable fineness. For a hard surface, such as steel or brass, a selected oxide of iron, or emery powder or powdered bath brick is suitable; but for a softer surface, such as copper, a less gritty material must be used, and whiting, putty powder or some similar substance may be chosen. For plate powders, again, the materials have to be still more carefully selected and the powder must be of absolute fineness. Such powders usually contain specially prepared rouge which is one of the softer oxides of iron containing a very small proportion of silica or putty powder, or finely powdered bone dust. A tried recipe for silver and plate polish is as follows:—(a) Paris white and bone dust, equal parts; (b) calcined magnesia, 2 parts; and putty powder, 5 parts; (c)

calcined magnesia, 5 parts; and finely powdered rouge, 1 part.

Alloys for Type Casting.

3045. M. K. R., Cuttack.—Wants to know the composition of alloys for type casting.

To be suitable as a type metal, an alloy must allow of being readily cast, fill the moulds sharply, and at the same time be as hard as possible. Though it is difficult to satisfy these demands entirely, an alloy consisting of lead and antimony best answers the purpose. Antimony hardens lead, and if too much were used would render it brittle. The following alloys are now used as standard type metals:—

	Lead	Antimony	Tin	Copper.
Electrotype	93.00	4.00	3.00	none.
Stereotype	82.50	13.00	4.50	„
Linotype	83.00	12.00	5.00	„
Type Metal	58.00	15.00	26.00	1.00

Discharges in Calico-Printing.

2087. A. P. S. R., Cocanada.—Asks, how are discharges in calico-printing effected?

Discharges are substances printed upon goods the whole of which had been mordanted, the object being to remove the mordant from places where whites are to appear, consequently when the piece is dyed only, where the mordant is intact will the cloth be coloured; these discharges are made principally with tartaric, or acetic acid. The acid containing discharge having been printed on, the goods are then taken through a solution of bleaching powder (chloride of lime). The result is that where the

acids have been printed on chlorine gas is liberated, which destroys the dye colour, leaving in the simplest cases a white design upon a coloured ground.

The process known as Turkey red styles, is simply printing upon cloth which has previously been dyed Turkey red by means of discharges, which may or may not be made so as to yield coloured patterns. The base is citric or tartaric acid, thickened with a suitable paste, and if for colours, containing a salt of lead for a yellow discharge, or ferro-prussiate of potash for a blue discharge, or iron and log wood for a black discharge. After printing on the discharges, the goods are passed through a bath of bleaching powder, well washed, and then, if lead has been printed on, passed through a bath of bichromate of potash, when chrome yellow will be produced. If the prussiate of potash has been printed, a blue colour will be developed. Green is obtained by mixing both discharges first.

Ceramic Photography.

3195. M. M. S., Nagpur.—Asks how photos may be transferred on porcelain.

Ceramic photography lends itself to reproduction of photographs on porcelain. A sheet of ground glass is covered with bichromate of potash, dextrine and grape sugar dissolved in water, and exposed to the light under a positive. If a negative is used, the sheet of glass must be covered with an aqueous solution of perchloride of iron and tartaric acid. The surface is dusted over with a vitrifiable colour. The developing of the excess of colour is removed,

the glass coated with a layer of normal collodion, and plunged into some slightly acidulated water. The collodion comes off, taking with it the vitrifiable colour which is applied to the ware. If the collodion is placed underneath, it need only be dried and burned; if on the contrary, it has been applied to the ware on the side where the colour is, the collodion must be dissolved off with a solution of alcohol, ether, and spirits of lavender.

Baking Powder.

2972. M. L., Podar.—Wants recipes for baking powder and egg powder substitutes

Mix together

Tartaric acid	3 oz.
Bicarbonate of soda	3 oz.
Carbonate of magnesium	$\frac{1}{2}$ oz.
Rice flour	8 oz.

Egg Powder Substitute.

Mix together

Turmeric (powder)	dr.
Bicarbonate of soda	lb.
Cream of tartar	lb.
Ground rice	lb.

Gold Coating for Copper.

3030. K. D. S., Bellary.—Asks "How copper may be coated with gold without electroplating?"

Dip the copper objects in a boiling mixture of the following two solutions.

First Solution:—

Pure Caustic Potash	1 dr.
Sodium Phosphate	$\frac{1}{2}$ oz.
Water	1 $\frac{1}{2}$ pints.

Second Solution:—

Gold Chloride	15 grs.
Cyanide of potash	$\frac{1}{4}$ oz.
Water	$\frac{1}{2}$ pint.

Mix both solutions and boil. .

Wire-drawing.

2455. K. C. L., Puri.—Writes, "Will you kindly explain the principles of wire drawing."

Wire is drawn by pulling a rod of the desired metal through a tapered hole in a block of chilled iron or hard cast steel, the final size of the tapered hole being smaller than the size of the rod by the amount the latter is to be reduced in a single pass. It is a process of reduction by plastic deformation induced by pressure from the sides of the hole. If a hole is made in the bottom of a vessel containing water, the water is forced through the hole by the pressure or weight of the water above. Similarly certain solids—such as pitch—will slowly flow through such a hole and some of the very plastic metals, such as lead or Muntz metal, can be forced by direct pressure through an orifice. This is called extrusion. Most metals, however, are too rigid at the normal temperature to be applied indirectly and in such a way that its action is severally local. This is accomplished by means of the wire-drawing die, or draw-plate.

It is apparent that the flow of the metal is due to the circumferential pressure of the die induced by the direct pull. Although this pressure is severely local it is, nevertheless, applied gradually, in the case of hard metals, according to the taper of the die. The taper and bear-

ing of the die depend mainly on the material being drawn and the reduction per pass. A section through the hole generally shows a small parallel portion, particularly in a die for drawing hard metals. This is caused by the final set punch, which leaves sufficient length of the same size as the reduced diameter of the wire to prevent pulling out. The length of the actual bearing including the tapered portion, of course, depends on the size of the wire as well as on the material. It is difficult to lay down any hard and fast rules regarding the taper of the die and the length of the bearing, but in general it may be stated that when friction is reduced to a minimum a long bearing will give the finest results. For roughing down from the rod short bearings are to be preferred, because the friction is generally great owing to the rough surface of the rod. For finishing hard drawn wire, on the other hand, a long bearing can be used, because the surface of the wire is smooth and the wire will stand more pull. Theoretically, then, the longer the bearing the better, but practically, owing to the many difficulties in drawing, short bearings are preferred.

Wire is usually drawn into round or cylindrical form, but it may be made of any required cross section by varying the outline of the holes in the plates through which the wire passes in the process of manufacture.

Tea Syrup.

3129. H. H. R., Oudh.—Wants recipes for tea syrup.

(1) Black tea, 3 oz.; green tea, 5 oz.; granulated sugar, 36 oz.; boiling water, 16 oz.

(2) Best green tea, 1 to 2 oz.; boiling water, 2 pt.; citric acid, $\frac{1}{2}$ oz.; sugar, 56 oz. Infuse the tea in boiling water; strain the liquid, add enough water to complete 2 pt. and with the aid of a gentle heat dissolve in it the citric acid and the sugar. Strain the syrup through flannel and keep it in a cool place.

Printing on Celluloid.

3157. S. R., Simla.—Enquires how printing on celluloid is done.

Printing on celluloid is performed as follows:—

On the one hand, the desired pattern, etc., is printed on paper or similar substance; and on the other the celluloid is moistened with a known solvent, such as alcohol, ether, etc. On pressing the paper and celluloid together a portion of the ink on the former dissolves out and intimately mixes with the dissolved surface of the celluloid, thus forming a waterproof design.

Artificial Beers.

3065. S. V. R. N., Ahwaz.—Writes, "Please quote me some recipes for non-alcoholic or artificial beers.

1. HOP BEER.

Take water, 5 pt.; hops, 6 oz. Boil 3 hours, strain the liquor, add water, 5 pt.; bruised ginger, 4 oz.; and boil a little longer, strain and add 4 lb. of sugar; and when milk warm, 1 pt. of yeast. Let it ferment; in 24 hours, it is ready for bottling.

2. LEMON BEER.

Boiling water, 1 gal.; lemon, sliced, 1; bruised ginger, 1 oz.; yeast, 1 teacupful; sugar, 1 lb. Let it stand 12 to 20 hours, and it is ready to be bottled.

3. MOLASSES BEER.

Take 14 lb. molasses, $1\frac{1}{2}$ lb. hops, 36 gal. water, 1 lb. yeast. Boil the hops in the water, add the molasses and ferment.

Office Paste and Gum.

3168. M. D., Madura.—Requires formulas for gum and paste suitable for office stationery.

1. GUM.

(a) Pulverised tragacanth 1 oz.; glycerine, 4 fl. oz. (b) Boiling water, 16 fl. oz. Macerate the tragacanth with the glycerine in a glass mortar, then stir the paste into the boiling water. This makes a very thick mucilage; 32 fl. oz. of boiling water gives a medium, and 64 fl. oz. a thin paste. Tragacanth paste works very smooth, but is not very adhesive.

2. STARCH.

Flour, 4 oz.; powdered alum, $3\frac{3}{8}$ oz.; water 1 pt.; oil of cloves 20 drops, salicylic acid, 20 grams; alcohol 2 dr. Mix the flour and alum, and sift; add water slowly until a perfectly smooth mixture results. Then cook over a steady fire or flame until the paste is made. As it is cooling add the clove oil and salicylic acid, dissolve the alcohol. Bottle in wide-mouthed bottles of 3 or 4 oz. each, cork well, and keep in a cool dry place.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

2986. P. V., Ongole.—Process of preparing peppermint tablets appeared in February 1925 issue. First prepare ink powder according to the recipe given in July 1926 issue, then make tablets in a tablet making machine. Lozenge making machines may be supplied by Seth Deep Chand & Co., Sukkur, Sind. Bergamot may be bought of Sikri & Co., Post Box No 2287, Calcutta; Paradise Perfumery House, 75, Colootola Street, Calcutta and D. G. Gore, 31, Mangaldas Road, Market, Bombay No. 2. Dyes may be bought of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. Alkanet root may be had of Bansidhar Dutt & Sons, 126, Khengraputty, Calcutta. Chua and other ingredients also may be supplied by the above firms.

2988. H. N. R., Secunderabad.—The following are correspondence universities of America—International Correspondence School of Scranton, Scranton; Alexander Hamilton Institute of New York, New York, and University of Kansas, Kansas.

2992. B. M. N., Lahore.—Vanishing cream is a kind of toilet article used as face cream. Smelling salt is also a toilet used in case of headache.

2994. K. T., Puloly West.—Recipe of "Koda" is not known. Purity of gold and silver can be detected by rubbing on touch-stones and examining the marks left. Tests for precious stones appeared in August 1924 issue. To detect presence of copper or other metals inside the coating of gold ornament you can use the specific gravity method. The sp. gr. of pure gold is 19.3 while that of copper is 8.6.

2996. M. P. S. C., Vizianagram.—For nickel ingot, enquire of Balmer Lawrie & Co, 103, Clive Street, Calcutta.

2997. K. V. D., Kumbakonam.—For books on silk industry enquire of Thacker Spink & Co., 3, Esplanade East, Calcutta. For silk

weaving and reeling machine write to Salvation Army Depot, Dharamtalā Street, Calcutta.

3000. K P S., Jubbulpore.—Wants to be put in touch with fresh and dried fruit merchants of Rawalpindi and Peshawar.

3001. L. C. B., Lyallpur.—Wants addresses of match factories and cigarette companies of Karachi, Bombay and U. P.

3002. N V. K., Naregal.—Your query being of the nature of an advertisement cannot be treated in this column.

3003. V D., Tanuku.—Your enquiry is not in our line.

3005. S. P., Kandy.—If you go through "Indian Tobacco and Its Preparation" published by this Office you will learn a good deal about the varieties of tobacco, their treatment and manufacture. You may also consult "Tobacco" by A. E. Tanner and (2) "Tobacco" by C. G. Warnford Lock. Hints on blending tobacco appeared in August 1926, both for cut tobacco and cigarettes. It would be advisable for you to engage a cigar expert.

3006. D. R. P., Tanjore.—Gas mantles may be had of Fani Bhusan Kundu, 85, Harrison Road, Calcutta, London Eastern & American Trading Co., Hummum St, Fort, Bombay, Sun & Co., Tanjore.

3007. A. C. Godavari.—Books on soap manufacture may be had of Chuckervertty Chatterjee & Co, 15, College Square, Calcutta.

3012. E. P. H. N., Ceylon.—Sap green is a light green pigment prepared from a kind of berries. If it be not available you may substitute any other suitable colour. Try K. L. Dutt & Co, 75, Maniktola St., Calcutta.

3013. S. B. J., Pendra Road.—A recipe of hair lotion appears elsewhere. If the soap be properly salted out at the time of manufacturing and seasoned for some time afterwards it will not "wet."

3014 S. M. A. B., Bombay—You will find all the information required if you go through the series of articles on exportable commodities of India that appeared in Vols. 1, II, III, IV, V of **Commercial India** and is still appearing.

• 3015 M. T. M., Burina—Wants addresses of dealers in gas fittings.

3016 D. S., Sargolha—The following are the addresses you want: Government Poultry Farm, Elah, U. P. (2) Advani Poultry Farm, near Municipal Office, Hyderabad, Sind.

3017 D. K., Guntur—A brown dye may be obtained by boiling tamarind seeds. There is no directory of villages. Commercial Directory, Published by Thacker Spink & Co., 6, Mangoe Lane, Calcutta, will serve your purpose. Shank & Co., St. Benedict's Chambers, Fenchurch 4, London, E. C. 4 are a firm of indigo merchants.

3018 K. P. P., Bombay—You can consult some books relating to enamelling on gold and silver to be had of Chuckerjitty Chatterjee, & Co., Ltd., 15, College Square, Calcutta.

3019 S. M. R. G., Srinagar—Good teas may be had of (1) Mukherjee Bros. & Co., 17/19, R. G. Kar Road, Calcutta. (2) Paulit Bros., 108, Cornwallis St., Calcutta. (3) Buttacharjee & Co., 64, Cornwallis Street, Calcutta. For celluloid films please enquire of M. N. Ghose & Co., 20-1, Lal Bazar Street, Calcutta. Thick cardboard may be supplied by Ghose Brothers, 63/1, Radha Bazar Street, Calcutta. Electrical goods may be supplied by Messrs Mc Lawrie & Co., Ezra Street, Calcutta. Many of hardware articles can be supplied by our subscribers.

3020 B. S., Sivaganga—An article on dry cells appeared in November 1921 issue. Take legal steps against the firm.

3021. A. N. S., Patna—A recipe for rubber stamp ink will be found in the book on Ink Manufacture published by this office.

3022. K. N. R., Hassan—The Indian Business Directory published by Thacker Spink & Co., 6, Mangoe Lane, Calcutta, may serve your purpose.

3023. C. S. S., Masulipatam—A complete list of all the newspapers of India will be found

in **Thacker's Indian Directory** 6, Mangoe Lane, Calcutta.

3025. R. M. G., Barisal—A recipe for cheap washing soap appeared in January 1926 issue.

3027 T. I., Cochin—Your enquiry is not in our life.

3028. A. J., Monghyr—Baking powder is required for loaf and bread. A recipe appears elsewhere. A suitable oven for baking may be had of T. F. Thompson & Co., 9, Esplanade East, Calcutta.

3029 V. G. A., Bombay—For Extract violet try P. Mookherjee & Co., College St. Market, Calcutta.

3035 M. K. R., Cuttack—Dutt Engineering Co., 44/1, Murari Pukur Road, Calcutta, may undertake repairing of cast iron parts.

3036 C. L. D., Multan City—It would be advisable to consult a lawyer.

3037. P. C. C. S., Palkonda—Essences may be had of Paradise Perfumery House, 75, Colootola St., Calcutta. (2) Sikri & Co., P. B. 2287, Calcutta. Requires the service of a glass expert.

3043 K. S. N., Madras—Recipes of all the articles appeared in the last and current volumes of **Industry**. Your other queries being in the nature of an advertisement cannot be published in these columns.

3046 S. D. B., Jherriah—For courses on Book-keeping etc., write to India School of Accountancy, Post Box 2020, Calcutta. For books



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**CARR & MAHALANOBIS,
3/D, Chowringhee, Calcutta.**

on mining enquire of Chackraverty Chatterjee & Co, Ltd., College Square, Calcutta

3047. G. P. K., Hindupur.—For cornflour machines try Jessop & Co, Clive St., Calcutta

3048. A. P. S., Bhampur.—For baling press enquire of Marshall Sons & Co, Ltd., 99 Clive Street, Calcutta.

3052 P. R. B., Bilaspur—Hosiery business is a profitable no doubt. But as you are a new in the line it is advisable for you to consult an expert or to be an apprentice in a hosiery factory as there is no arrangement for teaching it. One month will be sufficient for an intelligent man to learn the process of knitting. For machine you may write to W. H. Brady & Co., 26, Strand Road and Indo Swiss Trading Co., 27, Pollock Street, both of Calcutta who will furnish you with estimates

3053 A. T. B. Calcutta—Regarding the recipe of snake bite cure referred to by you consult a physician

3054 N. M. M., Ode—You may purchase Martin's Organic Chemistry that may be had of Chakravarty Chatterjee & Co, Ltd., 15, College Square, Calcutta. Other books also may be had of the above firm. Sandals may be bought of Roy & Co., 1, Cornwallis Street, Calcutta

3055 N. I. S., Jodhpur—Artificial asafetida is prepared by dissolving $\frac{1}{2}$ oz. of the real stuff in 2 pints of pure sheep's milk and setting apart the mixture in a new earthen ware vessel to ripen. When fermentation is complete remove the scum and dry it. The product is a good substitute for hugg. Reply to your query No 2482 appeared in December issue. As regards No 2698 see January, issue

3056 K. R. A., Nileshtar—The advanced rate of pepper is due to damage of growing crop and overseas demand. It is very difficult to ascertain the future tone of the market. But

it is expected that the steady tone will be maintained till some months to come.

3059. M. S., Mirzapur.—Wants to be put in touch with firms interested in gorachan and stag horns

3061 B. D. S., Budaun—For securing regular buyers of used postage stamp advertise in the pages of newspapers and periodicals. In the meantime you may correspond with A. N. Seshagiri Rao, Linga Chetty Street, G. T., Madras and P. Bhima Rao, Civil Lines, Bellary

3063 S. H. M. R. B., Rajgangpur—No machine for biri making is available

3064 C. K. S., Chemarayapatna.—Process of constructing a dry cell appeared in October 1922 issue. Process of silvering mirror appeared in the last issue

3066 K. M., Noakhali—Water glass may be bought of Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square, Calcutta and B. K. Paul & Co., 1/3, Bonfields Lane, Calcutta. Wants to be put in touch with egg merchants of Calcutta and Rangoon

3069 B. C., Muttra—Paper and stationery articles may be had of Nilmoney Halder & Co., 106, Radha Bazar Street, Calcutta; L. N. Chunder & Co. 114, Radha Bazar Street, Calcutta, Indian School Supply Depot, 809, Bowbazar Street, Calcutta, Bombay Stationery Mart, Victoria Bldgs, Parsee Bazar Street, Bombay and M. Damodar Bros, 7, Church Gate Street, Bombay. Matches may be bought of Lalchand Bros, Match Depot, 33/A, Central Avenue and H. Rashid & Co., 15, Zakaria Street; both of Calcutta. Cigarettes may be supplied by Karim Bux & Elahie Bux Bros, 58/4, Canning Street and Imperial Tobacco Co., Ltd., 5, Fairlie Place, both of Calcutta. Formic acid may be had of B. K. Paul & Co., 1/3, Bonfields Lane and Bengal Chemical & Pharmaceutical Works, 15, College Square; both of Calcutta. A good recipe of face cream will be found in January 1926 issue of *Industry*.

3070. M. J. V., Bombay.—For particulars of the jointstock companies mentioned by you write to the Registrar, Joint Stock Companies, Government Place, Calcutta.

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Of 20 Pages containing Hygienic Practical methods approved by competent authorities is sent on application, with a One Anna Stamp for Postage,
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29-1, Telipara Lane, P. O. Shambazar, Calcutta.

3074. D. M. M., Jamnagar—Shoes may be supplied by Bengal Boot House, Mantola, Delhi Final Shoe Factory, Shafa Khana Road and Shahgunj Shoe Factory, Reza Manzil, Shahgunj; all of Agra

3077 A. A., Bombay—The firm inform us that they are an agent for many newspapers, Indian and foreign

3078 R. N. D., Rewa—Picture frames may be supplied by Bombay Fine Art Gallery, 69, Esplanade Road, Bombay, Star Art Framing Works, 40, Meadows Street, Fort, Bombay, Pullee & Co., 72, Apollo Street, Bombay; Fotie Lal Seal & Sons, 10, Swallow Lane, Calcutta and Hem Chandra Chander, 13, Swallow Lane, Calcutta. Novelties and fancy goods may be supplied by K. G. Mannai, 55/1, Canning Street, Calcutta, the Union Trading Co., 160, Harrison Road, Calcutta, Mahomedbhoy Jivabhoj & Co., Nizam Street, Bombay No. 9 and Ahmedali Gulamali Adab, Karim Mistry Bldg., Sandhurst Road, Near Dongri Bazar, Bombay. Sunlight soap may be bought of M. Framroze & Co., 9, Bank Street, Bombay. Carpenter's tools may be supplied by N. G. Mitra, Chandney Chowk, Calcutta and goldsmith's tools may be had of A. J. Soor, Bagh Bazar, Calcutta. Other addresses you require will be found elsewhere in these columns

3080 N. R. C. I., Muktsai—From worn-out files you can make articles of steel. Other things mentioned by you cannot be well utilised

3081 R. M. R., Calcutta.—About artificial slate coating your enquiry is receiving our attention

3082 A. T. P., Veppanapulli—We do not require any article. We only furnish information to our constituents. For disposing silk fibre manufactured by you advertise in the pages of **Industry**.

3083 P. N. R., Challakere—For woven labels enquire of Army & Navy Co-operative Society Ltd., Chowringhee, Calcutta.

3084 L. D., Jaipur City—For marking linen you should use marking ink that may be had of D. Batcha & Co., 1, Jones Lane, Madras and Tandon Brothers, 32, LaTouche Road, Lucknow. For the machine required enquire of Oriental Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta

3087 S. B., Bikaner—For the perfume required enquire of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta. For tariff valuation booklet write to the Superintendent, Central Book Depot, 8, Hastings Street, Calcutta. To communicate with any querist write him with number and initials under care of **Industry** when your letter will be duly redirected

3088 M. L., Avarampuducheri—Process of refilling dry batteries appeared in June 1923 issue. Carbon rod may be had of Subol Chandra Basak, Prasanna K. Tagore Street, Calcutta. For books on dyeing yarn you may write to Chakravarty Chatterjee & Co., 15, College Square, Calcutta. Other enquiries are not in our line

3090 S. V. B., Bellary—Scales and balances may be bought of Avery Ltd., Waterloo Street, Calcutta

3092 R. S. B., Baire—For rattan furniture write to Art Furniture Depot; A. Frankel & Co., and The Frankel Furniture Co.; all of Singapore

3093 B. S. R., Balha—Import duty on machines to be worked by manual or animal power and any machines which require for their operation less than one quarter of one horsepower power is charged at 2½ p.c. while that on other machines is charged at 15 p.c.

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Calcutta—84A, Clive St.,

Post Box No. 675

Karachi—Bunder Road,

Post Box No. 230

Madras—Post Box No. 1260

Note.—All kinds of Mvers Pumps as shown in the block can be had of us at moderate prices



3094 H Z, Benares City—You may supply eggs and chickens to local hotels and restaurants

3095 D. S. S. B, Karachi.—You may go through Match Industry in India by K. C. Sen to be had of Bhawan Engineering & Trading Co., 122½, Upper Circular Road, Calcutta

3097 K S C, Kottayam—You may go through Eastern Philatelic Journal, Post Box 10, Madras

3098 P F P, Cochin—For exchanging used postage stamps put an advertisement in the Sale, Exchange & Notice pages of **Industry**.

3099 K S, Bombay—Take medical advice

3100 B B S, Cachar—Your enquiry being in the nature of an advertisement should not be published in these columns

3101. S K M, Bombay—It is not customary to take formal permission for sticking posters in public places. A suitable adhesive is made by boiling waste flour in water in the form of paste. Duplicator is a comparatively simple appliance for duplicating a certain number of copies. Ronco is the name of a particular type of duplicator. Please enquire of the Remington Typewriter Co, for it Lithograph and Stereo are by affairs cannot be worked in the office. You may send your queries to the Director General, Commercial Intelligence Department, 1, Council House Street, Calcutta. Ferguson's Ceylon Directory may be had of The Ceylon Observer Ltd, Colombo and The Burma Directory and Diary from the Rangoon Gazette Press, Rangoon. It would be advisable for you to consult some ad-

vertising agents. Enquire of Thacker's Indian Directory Ltd, 6, Mangoe Lane, Calcutta for the insertion of your name. There is no Exporters & Importers Guide in India. Books on ship-broking may be had of Thacker Spink & Co, Esplanade, Calcutta. "Property" published from Lyons Court, Lyons Range, Calcutta, is a magazine for landlords. When a consignment is despatched on condition that the consignee will pay the charges it is "to pay." But when the charges are paid in advance by the consignor it is "Paid."

3107 D C D, Ardrah—Wants the address of the Chief Agent of Phoenix Sewing Machine Co, in India

3109 P G B, Kumbakonam—Gunny bags may be supplied by Birla & Co, Canning House, Canning St, Calcutta. The Managing Agents of Titagar Paper Mills are F. W. Heilgers & Co, Chartered Bank Bldgs, Calcutta

3111 M A R, Nowgong—For machines for making sugar webs enquire of The Oriental Machinery Supply Agency, 20½ Lall Bazar, Calcutta

3113 J M C, Malabar—Of the four industries mentioned by you soap making and perfume making will be profitable. Candle and Boot polish manufacture are not suitable for you. You can learn everything about perfumery from the book on Perfume Manufacture to be shortly published by this office. Formulas on soap making appear occasionally in **Industry**.

3114 K N R, Hassan—A few well-circulated newspapers in India are:—(1) A B Patrika, Baghbar, Calcutta, (2) Hindu, Madras, (3) Bombay Chronicle, Bombay, (4) Leader, Allahabad, (5) Advocate, Lahore

3115 M A S, Cuddapah—Wants addresses of indigo dealers in Kabul, Multan & Punjab

3117 L H Shikarpur.—The so-called radium watches are made by luminous paints a recipe for which appeared in October 1926.

3118 S M M, Bandra—Pictorial calendars may be printed by Stern & Schiele, Berlin S. 14 and Carl Hoinkis Hamburg, 8E E; both of Germany.

Bengal Sattie Food

(Gold Medalists and Registered)

Certified By Government Medical College
USE FOR INFANTS AND INVALIDS

Manufactured by:—

• **AMULYA DHONE PAL,**

General Merchant & Order Suppliers

Factory—Baranagar and Barisal,

Office—113, 114, Khagrapetty St., Calcutta.



3119. M. K. R., Cuttak.—A description of the process for the manufacture of Vegetable ghee appeared in January issue.

3120. S. M., Tavoy.—Pottery Manufacturers:—(1) Calcutta Pottery Works, Tangra, Calcutta. (2) Perfect Pottery Co, Jubbulpore. Paint Works:—(1) Murarka Paint & Varnish Works, Sodepur, near Calcutta. (2) Calcutta Paint & Varnish Works, Mackenzie Lyall & Co., Mission Row, Calcutta.

3121. H. B., Bellary.—For steel types enquires of Rae & Co, 6/A, Madge Road, Calcutta. You can build one on the model of an embossing machine.

3122. I. W. C., Jullundur.—Approximately 123 Swiss francs are equivalent to £1 sterling.

3125. P. C. T., Malabar.—Materials for ink manufacture may be supplied by K. L. Dutt & Co, 78, Manicktolla Street, Calcutta.

3128. G. C. Hubli.—For destroying the crop pests effectively seek the advice of The Director of Agriculture of Your Province. Hand power weaving machines and Doll making machines may be had of The Oriental Machinery Supply Agency, Lal Bazar, Calcutta. Your other query is unintelligible.

3130. S. N. L., Gorakhpur.—There appears to be a good market for the products mentioned by you. The success of a business depends upon several factors: cost of manufacture, demand, competition, margin of profit and the like. The articles enumerated by you are chemicals, which may be supplied by K. L. Dutt & Co, 78, Manicktolla St, Calcutta.

3131. M. S. Y., Pegu.—Please be more explicit.

3133. L. E. R., Tanjore.—Tin plates may be had of Balmer Lawrie & Co, 103, Clive Street, Calcutta. Glass sheets may be had of Fote Lall Seal & Sons, 10, Swallow Lane, Naran Chunder Dey, 2, Swallow Lane, both of Calcutta. A recipe for glass cement appears elsewhere.

3134. G. N. Dooars.—Many of our advertisers will supply you forest products such as beeswax, honey, lac, nuxvomica.

3136. M. N., Toungoo.—Young India, is published from Ahmedabad.

3137. D. C. S., Khurdah.—Enamel wares cannot be made on a small scale in India. Com-

plicated machinery is to be installed and furnaces built. A few lacs are required as capital. Addresses of some business training schools will be found in the advertisement pages of **Industry**. Hurricane lanterns may be made without permission but existing makes must not be imitated. You can hit upon some profitable business if you can go through the pages of **Industry** regularly.

3138. D. M., Cochín.—Wants addresses of silk sarree weavers of Kumbakonam.

3139. A. M., Nowgong.—Suitable colours for leather dyeing may be had of Amin Chand Mehra & Sons, 34, Armenian Street, Calcutta. A formula for dyeing leather in brown colour appeared in October 1921.

3140. K. C. G., Dinajpur.—Steel weapons may be had of D. N. Biswas, Gunsmith, Dalhousie Square, Calcutta. A long range of cutlery is made by Khan & Co, 70, Cornwallis Street, Calcutta. Instruments are manufactured by B. K. Paul & Co, Bonfields Lane, Calcutta.

3141. C. B. R., Coimbatore.—Enquire of The Book Company, whether any new edition of Deshi Rong (in English) has been brought out.

3142. K. S. S. 1, Mysore.—Electricity can be supplied to any town if there be waterfalls in the neighbourhood. You shall have to engage the services of an expert to make the necessary hydro-electric installation. For detective's materials enquire of Private Detective Agency, 181, Harrison Road, Calcutta. Your other query is not in our line.

3143. T. M. C., Chittoor.—Bottles may be decently capsuled with the help of a capsule fitting machine to be had of The Oriental Machinery Supply Agency, Lal Bazar, Calcutta.

3144. M. V. R., Khamampet.—Wants Tin-foed Milk Powder.

3146. P. L. Bareilly.—For Japanese cloths enquire of Mitsuibhusan Kaisha, Clive Row, Calcutta. The following are cotton mills in Bearwar: 1. Edward Mills Co. Ltd, Dighi Mohalla, Bearwar. 2. Krishna Mills Ltd, Bearwar, Marwara.

3149. A. N. R., Ellore.—A formula for making artificial ghee appeared in last issue.

3150. H. S. K., & Co., Lahore Curios and novelties are manufactured by Hans Meyer & Co., Bremen; Franz & Krauss & Co., Nurnberg, Chr. Frey Pforzheim; J. Brawn & Co., Goethestrasse 40, Berlin. For silk handkerchiefs enquire of Calef Bros., 546 Broadway; Tilton and Kuler, 61 Worth Street; Metcalfe Bros & Co., Everett Bldg. All of New York.

3152 M. R. N. R., Ramnad.—Typewriters may be had of (1) British Typewriter Co., 5, Old Court House St., Calcutta (2) Remington Typewriter Co., 3-1, Council House Street, Calcutta (3) Warden & Co., 3, Dalhousie Square, Calcutta (4) Mlick Typewriter Agency 56, Esplanade Road, Bombay. (5) Y Narayan, 364, Esplanade Row, Madras

3158. P. R. B., Simla.—Rubber heels for shoes are made by Tacifed Rubbers, 7-A, St Mary's Row, Birmingham. Acid proof stone jars, may be had of Barker Pottery Co., Chesterfield, England. Matches are made by The Bande Mataram Match Factory, Tollygunj, Calcutta. Wants addresses of the maker of I. X. L. Jams. Other addresses required will be found in these pages of last issue.

3159 G. S. C., Karachi.—Please communicate with the parties quoting the number and initials under care of this office when the letters will be duly sent to proper addresses

3160 S. K. S., Nowgong.—Please consult a lawyer. Ice cream making machines may be had of Sat Cowrie Das & Co., Old China

Bazar St., Calcutta. You can advertise in the pages of **Industry** for a capitalist to start a cotton mill at your place.

3163 B. K. R. S., Bodinayakamer.—Wants addresses of manufacturers of Phoenix Sewing machines. A capital of rupees 5 hundred to 1 thousand may suffice to start such small home industries as rubber stamp making, etc.

3165 G. V. S. C., Madras.—The following are journals for Jewellers: (1) The British Jeweller, Graven House, Kingsway, London, W. C. 2 (2) Jeweller & Metalworker, 24 Clerkenwell Road, London, E. C. 1

3166. R. E. N., Kumbakonam.—Journals on motor car (1) Auto, 36, Great Queen St., W. C. 2 (2) Automobile & Carriage Builder's Journal, 37-38, Strand, W. C. 2. (3) Automobile Engineer Dorset House, Tudor Street, E. C. 4 All of London

3169 L. N., Salem.—For tea plants enquire of (1) Langkachie Naholia Tea Seed Syndicate, P. O. Panitola, Assam (2) P. N. Gogoi, Namrup, Assam

3170. B. M., Ajmer.—Can supply Bakul Bark in large quantities for tanning

3172. J. C. W., Bombay.—You shall have to consult a chemical expert

3176 J. M. B., Godhra.—Can supply moonlight in any quantity

3177 M. I. K., Sheikpura.—Industrial books may be had of (1) Chackerbertty Chatterjee Co., Ltd., 15 College Square, (2) The Book Company, 4/A, College Square, both of Calcutta.

3178 T. B., Ganjam.—Regarding mechanical ploughing seek the advice of the Director of Agriculture of your province. For tractors write to Ford Motors Ltd., Calcutta

3179 R. A., Ahmedabad.—Webster's International Dictionary in 2 vols. will be suitable for your purpose.

3180. D. P. Etah.—The address of the Consul General for Belgium, is C-4, Clive Bldgs., Calcutta

3183. R. K. B., Satara.—Enquires whether sand paper is manufactured anywhere in India. Did you not once make it? The Director-General of Commercial Intelligence, 1 Council

Kaminia Oil

(Regd.)

Finest dressing for the Hair Delicately perfumed. Ke. 1/- per bot. charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot. of $\frac{1}{2}$ ounce Rs. 2/-, $\frac{1}{4}$ ounce Re. 1/4/-, V. P. & Packing extra.

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,

P. O. Box 2082, Juma Masjid, Bombay.

House Street, Calcutta will be able to furnish you the information.

3184. B. N., Rohak.—If you cannot master the technicalities of soap making it would be advisable for you to engage the services of a soap expert. You can use more oil instead of tallow or a mixture of one or two oils. The sp. gr. of soda lye may be determined by any make of hydrometer but Beaume's is generally employed. A formula for silicating soap appeared in May 1926

3185 C. F., Bellary.—The article on Biri-making is complete by itself. We do not deal in the raw materials, such as biri leaves, but these may be supplied by many of our advertisers.

3187 V. C. M. W., Karachi.—A description of the process for manufacturing artificial ghee, appeared in last issue.

3189 M. V., Madras.—The following are the addresses required. Nib Manufacturers — (1) D. R. Puri & Son, Gujrat, (Pb.); (2) C. D. Krishna & Co., Lahore, Cutlery Makers — (1) Khan & Co., Hartaki Bagan Lane, Calcutta (2) Ram Kishore Chhotey Lall Sharma, Hathras, U. P. (3) Krishna Cutlery Works, Wazirabad, (Pb.)

3191. Y. I., Tinnevely.—If you write to the Imperial Entomologist, Agricultural Research Institute, Pussa, Bihar you will receive a necessary information regarding sericulture. A series of articles on silk industry appeared in 13th volume of **Industry**. You may also consult the following books. (1) Silk in India by M. N. De (2) Silk in India by Booth Tucker, (3) Silk in India by J. Geoghegan to be had of Thacker Spink & Co., Esplanade, Calcutta. It is difficult to suggest who will buy silk produced in your farm. But you may try dealers in raw silk and such establishment as Government Weaving Factory, Bangalore City.

3192. T. G. R. N., Madras.—Messrs Symington Cox & Co., Mercantile Buildings and Macbeth Bros. & Co., Ltd., Hare Street; both of Calcutta are dealers in laundry machines of different types. Write to them for price of the machines, cost of installation, running expenses, maximum capacity, power required,

etc., etc. and they will be glad to furnish you estimate of profit. The clothes are generally dried in Dydro-extractors particulars of which may be had of the second firm. It would be advisable for you to engage one expert in the beginning.

3196 R. M. S., Benares.—You may consult the following books. (1) Soap Manufacture by G. Hurst. (2) Art of Soap Making by A. Watt. For books on Artificial Silk Manufacture write to Chuckerverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. A book on perfumery will be shortly published by this office.

3197. K. M. A. N., Madras.—Apprentices are generally taken in railway workshops and by engineering firms. It would be impossible to collect a comprehensive list of them. You may write to the local Director of Industries.

3199 S. K. V. A., Salem.—Brown sugar is generally bleached by filtering the musconite through bone charcoal. On a small scale it is bleached by sprinkling solution of soda carbonate. In the indigenous method brown sugar is bleached by covering a layer with 'Seola' a kind of river weed. If you go through Sugar Manufacture by S. M. Hadi, you will learn everything about it.

3200 B. C., Jubbulpur.—No recipe of hair depilatory that removes hair forever is known. Formula of toilet soaps appeared in April 1925. Enquire of Mr. B. Dyer, Salisbury Square, Fleet Street, London E.C.4, for soap moulds.

3202 B. M. P. C., Gujrat.—For picture postcard write to Tuck Raphael & Sons Ltd., Raphael House, Moorfields, London, E.C.2.; City Post Card Co., 42, Mansell Street, London, E. 1.; Regent Publishing Co. Ltd, 318, Euston Road, London, N.W.1, Photo Chemic G. m. b. H., M. Stolpischestrass 37, Berlin, Germany; Stephen Green Co., Philadelphia, Pennsylvania, U. S. A. and Henderson Lithographing Co., Cincinnati, Ohio, U. S. A. Following are some of the confectioners. Karl Eiche, Ulin on Danube, Germany; Quaker City Chocolate & Confectionery Co., Philadelphia, Pennsylvania, U. S. A.; Sweet Candy Co., Salt Lake, City, Utah, U. S. A.; A. H. Baulu, 15 Mark Lane, London, E.C.3; Douglas & Gooch, 1, 2 & 3,

Marban Place, Queen's Park, London, W10 and Hartley & Moore Ltd, 171-173, Clapham Road, London, S. W. 9. Other addresses you require appeared several times in these columns

3204. A. K. S., Dacca.—Refer your query to the Calcutta Advertising Agency, 15 College Square, Calcutta

3205 P. N. G., Giridih.—Essential oils may be bought of Sikri & Co., Post Box No. 2287, Calcutta and Paradise Perfumery House, 75 Colootola Street, Calcutta. Mineral oil may be had of Anath Nath De, 3, Moidapatty, Bara Bazar, Calcutta. Fuller's earth may be supplied by Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta. Wants to buy tobacco leaves of Rangpur and Darbhanga

3206. M. A. S., Benares.—Silk goods may be had of K. Mootoomul & Co., 14 Main Street and G. L. Roche & Bros., 104, Main Street, both of Colombo, Ceylon. Draw plates may be supplied by United Wire & Supply Co., Auburn, Rhode Island, U. S. A. and Conjoint Jewellery Corp., New York, U. S. A. Wants to buy canary bird and canary bird seed. Canary bird cage may be had of W. Leslie & Co., 19, Chowringhee Calcutta

3208. N. P. L., Rohri.—Recipes of marking ink will be found in September 1923 issue of **Industry**. Hydrometers may be bought of Scientific Instrument Co. Ltd., Johnstonganj, Allahabad and Scientific Supplies Co., 29-32, College Street Market, Calcutta. You should read books on dry bleaching and dyeing that may be had of Thacker Spink & Co., 3 Esplanade East, Calcutta.

3209. E. C., Bezwada.—Gunnies may be bought of Birkmyre Bros., 6 Clive Row, M. M. Bhagat & Co., 72, Canning Street, Cumbhoy & Co. Ltd., 33 Ezra Street and Bird & Co., Chartered Bank Bldgs, Clive Street, all of Calcutta.

3211. B. K. Krosur.—Good recipes of snuff appeared in November 1924 issue of **Industry**.

3212. No Name, Madras.—Honey is simply a mixture of dextrose and levulose, together with a little sucrose, dextrines, flavouring matters, pollen, and a little free formic acid which acts as a preservative.

3213. S. C., Cawnpore.—You should use schimmel's essential oil for preparing hair oil.

3214. M. L., Tret.—Process of preserving fruits appeared in the last issue.

3218. A. N. G., Chakfadharpur.—There is no book on poultry farming in Bengali known to us. Articles on poultry raising appeared in November 1924, January 1925 and February 1925 issues of **Industry**.

3219. B. M. S., Lahore.—A good recipe of bottle capping mixture will be found in the last issue

3220. N. V. P., Madras.—The smallest camera reference of which was made in the December 1926 issue of **Industry** has not yet been put in the market

3221. K. N. R., Bombay.—Your enquiry is engaging our attention

3222. T. N., Fagu.—You should use vacuum flask for keeping water cool during the summer

3234. F. P. H. K., Wellawatte.—Sap green is a kind of colour and it may be bought of Ann Chaud Mehra & Sons, 34, Armenian Street, Calcutta. Wants an expert in marking ink manufacture

3235. M. G. P., Negapatam.—Cinema machine, film, etc., may be bought of J. F. Madan & Co., 5 Dharamtola Street, Calcutta. Tents may be supplied by H. Bevis & Co., Cawnpur and Delhi Cloth & General Mills Co., Delhi. Estimates will be furnished by the machine suppliers

3236. V. S. N. C., Tapeswaram.—Gramophones may be supplied by S. N. Bhattacharjee & Sons, 5 Dharamtola Street; K. C. Dey & Sons, Harrison Road and M. L. Shaw & Co., Dharamtola Street, all of Calcutta

3238. A. Y. D., Hubli.—Carbon sticks may be bought of Scientific Supplies Co., 29-32, College Street Market, Calcutta. Silk goods may be supplied by Manhattan Silk Co., New York, U. S. A.; Stewart Silk Co., New York, U. S. A.; C. I. Bonnet & Cie, 17, Cheapside, London, E.C.2; Shatwell Frank & Co., 28 Lawrence Lane, London, E.C.2 and Chemnitzer Handelsgesellschaft m. b. H., Chemnitz Lohstrasse 18, Germany. Woollen goods may be supplied by American Woollen Products Co.,

New York, U. S. A. and Andrews Mills Co., Frankford, Philadelphia, Pennsylvania, U. S. A.

3239. V. G., Chidambaram—Refer your query to the Director General of Air Service in India, Delhi.

3240. R. N. S., Bahadurganj—Refer your query to the Students' Information Bureau, 617, Kasba Peth, Poona City.

3243. V. S. P. P., Salem—The loose wool or yarn is thoroughly washed with soda and soap in the ordinary manner. It is then brought into a cold bath of 2 lbs. of hyposulphite of sodium to 11 gallons of water, where it remains for 1 hour, when it is taken out. 6½ lbs. of hydrochloric acid are then added to the same bath, the wool is replaced in it and allowed to remain for 1 hour. The vessel containing the wool must be well covered during the last treatment and the bath must be large enough to conveniently handle the wool in it. The loose wool or yarn acquires by this operation good appearance.

3245. T. N. D. R., Calcutta—Knead together ordinary pipe clay, moistened and ultramarine for blue, finely ground ochre for yellow, burnt ochre for red until they are uniformly mixed, roll out in thin sheets, cut and press into wooden or metallic moulds, well oiled to prevent sticking and allow to dry slowly at ordinary temperature, or at a very gentle heat. The product will be fit for tailor's use. Crude camphor is purified by sublimation when it settles on the sides and lids of the vessel. Recipes of blanco will be found in March 1922 issue.

3247. R. S. B., Benares.—We cannot advise you on the subject as the firm referred to by you has no good reputation in the market.

3249. S. A. G., Bombay—Your enquiry is outside the scope of our journal.

3251. J. F., Kandy.—There is no process of copying coloured pictures exactly like original. We have been assured by the representative of Messrs. Agfa Photo Co. whose picture you have sent that it cannot be done in any way. There is a kind of paper known as Transferrotype paper by which only pictures in black and white can be transferred.

3252. C. S., Bandra.—Beeswax may be bleached by exposure to the influence of the sun and weather. The wax is sliced into thin flakes laid on coarse cloth; and turned over frequently. Wants cotton rovings suitable for candle wick as also plaited wick for candles. The sparks are due to the impurities in the wick as you have guessed. Wants to be put in touch with beeswax dealer in Bina District.

3253. C. B. R., Combatores.—Wants fancy neck cloth made of silk cotton.

3254. D. M. V. A., Bikaner.—Books on Paint and Varnish may be had of Chuckervertty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

3255. D. P. B., Secunderabad—The following are the addresses you want: (1) Calcutta Hollow Wares & Tin Printing Ltd., 243, Upper Circular Road; (2) Calcutta Tin Printing Works, Post Box 6772, both of Calcutta.

3256. A. R., Madras—Printed tin pots may be had of the above firms. Wants to know the address of the Three Star Co., of Japan.

3258. O. T. C., Sinagar—Leather may be dyed or tanned by (1) Ray & Roy, 1, Cornwalis St., Calcutta. (2) W. S. Dossen & Co., College St., Market, Calcutta. (3) The National Tannery, Pagladanga, Entally P. O., Calcutta. Furs, hides, etc., may be cleaned by Cuthbert Son Harper & Co., Old Court House St., Calcutta. Knitting machines are worked by (1) Smila Hosiery, Smila, Calcutta, (2) Shome's Knitting Mills, Jhamajukui, Calcutta.

3259. S. K. R. N., Sankaridrug—You may communicate with the School of Tropical Medicine, Chittaranjan Avenue, Calcutta.

3261. R. H. S., Surat—Your query is not in our line.

ESSENCES, AND ESSENTIAL OILS

Perfumes, Chemicals and Sundries, etc.

Everything you need for Manufacturing. Hair Oils, Scents, Ottos, Soaps, Perfumed Waters, Syrups, Udbaths (Scented-Sticks) Zarda Tobacco, Snuffs, Pomades, Hair-Lotions and Perfumery preparations in general; can be had of us at very competent rates. Price list free. Apply to:—D. G. GORE, 31, Mangaldas Road, Market, Bombay No. 2.

3262. M. R. S., Gujrat.—You may consult Poultry Keeping in India by Isa Tweed to be had of Thacker Spink & Co., Esplanade East, Calcutta.

3263 B. A., Kotah—Wants to be put in touch with exporters of stag horns and other animal products from Bombay, Madras & Karachi.

3264 A. R. B., Ludhiana—See the Notice & Review column of January issue

3265 T. P., Madras—Formula of a hair cream appears elsewhere

3266 K., Ranchi—The articles may be had of Jadunath Ghor, Hukaputty, Calcutta

3267 M. A. K., Hazara—Grease is dealt in by (1) Calcutta Talbaw Mart, 19, Tiretta Bazar Street, (2) Indian Bristles & Lard Supply Co., 31½, Tangra Road, both of Calcutta

3270 S. C., Jullundur—The journals of which you require the addresses have ceased to exist

3271 P. D. K. C., Delhi—Your query is not in our line

3276 P. M., Nilgiris—A complete list of tea merchants of India may be found in Thacker's Indian Directory. List of chemical manufacturers of Germany and America will be found in Kelly's World Directory. Some of the leading manufacturers of chemicals in India are (1) Bengal Chemical & Pharmaceutical Works, 15 College Square, Calcutta (2) B. K. Paul & Co., Bonfields Lane, Calcutta (3) Calcutta Chemical Co., Ltd., 35-1, Pandit Road, Ballygunge, Calcutta (4) Bhavnagar Chemical Works, Vartej, Kathiawar, (5) Punjab Chemical Works, Shahdara, Lahore (6) Alenbic Chemical Works Co., Ltd., Govva Road, Baroda

VYDIER M. N. ITOOZHI'S OJESKARA (Regd.)

Best Vegetarian tonic drink for every day use in the place of Coffee tea etc. It is a specific for kidney, liver and urinary troubles and general debility. It is a body builder.
Price Two sizes, As. 12, † Re. 1 Per Tin.

**VYDIER M. N. ITOOZHI'S MEDICAL
STORES,**

Mayyil P. O., Kuthaparamba, Malabar.

3277. S. S. S., Amritsar.—Dealers in sewing machines:—(1) Victoria Sewing Machine Mart, 285, Hornby Road, Bombay. (2) S. N. Bhuttecherjee, 5, Dhurumtolla St., Calcutta. (3) Mancklal Gordhandas Kapasia Bazar, Ahmedabad (4) Central India Machine Co., Jubbulpore, (5) Nigam Bros., 737, Pahari Imli, Delhi (6) C. D. Motishaw & Co., 20, Canning Road, Allahabad. Addresses of Cycle dealers (1) Cycle Exchange & General Stores, 41, Meadows St., Bombay (2) Bentinck Cycle Co., 40, Bentinck St., Calcutta (3) M. A. Jankidas & Co., Garden Road, Karachi (4) V. Krishna & Co., Sami Naicken St., Mount Road, Madras (5) Colonelganj Cycle Agency, 686, Katra, Allahabad

3278 V. M. A. M., Pernambu—We do not deal in wax or anything else

3279 S. M. R., Tipperah—An article on ceramic industry appeared in July 1925. Soap may be cheapened by adulterating with soap-stone powder. Its detergent effect may be increased by incorporating rosin. A process of glass etching appeared in October 1926. The silvered backs of looking glasses are painted over with red paints

3281 S. J., Kurnool—Tin cans may be had of Gananand Rampratap & Co., 6, Halsi Bagan Road, Calcutta. The multiple husker cannot be had now. Enquire of Pioneer Mail Supply Co., 93½, Clive St., Calcutta, for "Kandbt." A large number of type written copies may be obtained either by (1) Printing in what are known as "typewriter types" or (2) On Roneo Duplicators. You will learn the export and import business and art of canvassing if you regularly go through **Commercial India**, the sister journal to **Industry**. Your remaining query being in the nature of an advertisement cannot be published here.

3282 R. P. B., Ajmer—A list of manufacturers of imitation jewels of Germany will be found above. Match machines may be had of The Bhowani Engineering & Trading Co., 122½, Upper Circular Road, Calcutta, who will also teach the industry. An article on dry cell appeared in November 1925.

3283. S. A. K., Bangalore.—For second-hand books on engineering subjects enquire of D. B. Taraporewalla Sons & Co, 103, Meadows St., Fort, Bombay, and S. C. Auddy, Wellington St., Calcutta.

• 3284 R. C. P., Gorakhpur—You would do better to read books on sugar chemistry to be had of Chuckerberty Chatterjee & Co, 15, College Square, Calcutta. Your other queries are not in our line.

3285 G. P. N., Dalman—Macerate mercury and copper sulphate in equal proportion when the product will be a pasty stuff which can be moulded into balls. Many patent medicines are available for curing opium habits.

• 3288. B. K. G., Calcutta.—Books on Confectionery may be had of Chuckerberty Chatterjee & Co, 15 College Square, Calcutta.

• 3289 R. K. R., Kurnool—You will learn everything about banana industry if you go through the articles on the subject that appeared in March 1926. Process of Plantain fibre extraction appeared in January 1927. The book of Mr Sarkar is out of print. For fibre extracting machine enquire of Sri Ganpatt Iron Works, Tinnevely Town.

• 3290 M. A. R., Kymore—We are not aware of any such plant that will indicate underground water or minerals. Most probably what witnessed was a ingenious trick. But that is outside our scope.

3292. K. N. K., Mangalore—Wants banana leaves from Nagpur, Horse gram from Ellore and Fruits from Kashmir. Many of our advertisers can supply gingelly oil, oil cake etc. Ginger can be bleached and dried in the sun. There is no substitute for coconut oil.

3293. D. P. G., Cutch—You will learn everything about silicate and their products if you go through Martin's Industrial Chemistry to be had of Chuckerberty Chatterjee & Co, Ltd., 15, College Square, Calcutta.

• 3294. S. K. A. R., Patna—Tea may be supplied by our advertisers. Electrical goods may be had of Mc Lawrie & Co., Ezra St., Calcutta. For oil, flour and other mills enquire of Jessop & Co, 103, Clive Street, Calcutta.

3296. P. N. R., Chitaldrug.—Woven labels may be supplied by Nakoor Ch Mallik, New Market, New Block, Calcutta.

3297 E. B. B., Ahmedabad—Formula of bar soap of high quality like foreign make appeared in November 1925. Artistic brass-ware for drawing room may be had of Gunamal Parsuram, 21, Park St., Calcutta. Fancy wood work such as photo frames may be had of (1) Guffarjod & Sons of Srinagar (2) Singh Singh & Co, Kashmir. Art wares of Agra and Jaipur are to be had of R. G. Bansal & Co, Agra. Swiss embroidery may be had of (1) Graf & Co, (2) H. Gruber, (3) E. Rohner (4) Schelling & Co, all of Rebsstein, Switzerland.

3301 K. G. K., Ajudhya—You may go through Bvabasa O Baniya, Lall Bazar Street, Calcutta.

3304 A. N., Gorakhpur—Matches are manufactured by East Bengal & Assam Match Factory, Muktagacha, Mymensingh; Amrit Match Factory, Bilaspur, Kotah, Sunderban Match Works, 12 Dalhousie Square, Calcutta; Ananta Match Manufacturing Co, Nazibabad, U. P.; M. G. Kale, Arab's Chawl, Agra Road, Ghatkoper, Bombay and Tollygunge Match Factory, Tollygunge Calcutta. Yarns may be had of Raulal Bhikabhai, Girgaum, Bombay and Jotindra Mohan Pal & Brojendra Mohan Pal, 192 Cross Street, Calcutta. Watches may be supplied by Abrecht & Co, Hornby Road, Bombay, Madorna Watch Co, Hornby Road, Bombay, Sincere Watch Co, Hornby Road, Bombay; K. Edulji & Sons, 5 Dharamtala St., Calcutta, Essoofally Hiptolla, Radha Bazar Street, Calcutta; Md. Ibrahim, Radha Bazar Street, Calcutta and West End.

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42, Strand Road, Calcutta.

Watch Co., Dalhousie Square, Calcutta. Fountain pens may be bought of N. L. Chunder & Co., Radha Bazar St., and Nilmoney Halder & Co., 106 Radhabazar St.; both of Calcutta. Gramophones may be had of S. N. Bhattacharjee & Sons, 5, Dharamtolla Street, Calcutta. Harmonium may be had of Dwarkin & Sons, Dalhousie Square, Calcutta; National Harmonium Co., 8A, Lall Bazar Street, Calcutta and Sarat Ghose & Co., 8 Dalhousie Square, Calcutta.

3306 S. P. R. R., Kurnool.—You may buy a copy of Seaborne Trade of India to be had of Govt. of India Central Book Depot, 8 Hastings Street, Calcutta. You may also go through Handbook of Commercial Information for India by C. W. E. Cotton to be had of the above depot. Almost all the minerals obtained in India have overseas demand. You may use Kelly's World Directory. For paper pulp making machinery you may write to Enger Hellesen & Co., Maskinaffar, Stockholm and A/B Hedemora Verkstader, Hedemora; both of Sweden. You may supply paper pulp to various paper mills that require paper pulp in large quantities.

3308 M. D. L., Patna.—Caustic soda and washing soda may be had of Calcutta Chemical Co., 35/1, Panditia Road, Ballygunge, Calcutta.

3309 S. C. N., Dharwar.—Pencils are manufactured by A. W. Faber, Stein bei Nurnberg, Johann Faber A-G, Nurnberg, Schanzackerstrasse 33 and J. H. Faber, Nurnberg Koberger Strasse 39-41, all of Germany. For soda water bottles write to C. Bruits Simon & Co., Schmudstrasse 26, Berlin, S. O.; Spiegel-u-Spiegel-las-Fabriken, Buchenbacher & Co., Signund, Markusstrasse 18, Berlin; Alexander Alfred & Co. Ltd., 195 Strand, London W. C. 2; Barnard William & Sons Ltd., 66 Fenchurch Street, London, E. C. 3 and Breffit Edgar & Co., Ltd., King's Cross, London, N. 1.

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23 Ram Rattan Bose Lane, Shambhagar, Calcutta.

3312 S. K. C., Chittagong—I give below a list of ivory goods manufacturers who may take ivory from you. Ghosh Dastidar & Co., 125, Bow Bazar Street; Bengal Industrial Co., 5/7 Russa Road; Matri Bhandar, 206, Cornwallis Street and N. K. Seal & Co., 195 Cornwallis Street; all of Calcutta.

3313 S. S., Calcutta.—For learning, cinema operating you may try to be an apprentice in J. F. Madan & Co. Ltd., 5 Dharamtolla Street, Calcutta.

3314 S. C. B., Dhubri.—Wants to know the address of K. N. Layer & Co., of Ceylon.

3315 S. S., Ludhiana.—For books on dyeing and bleaching write to Chakravartty Chatterjee & Co., Ltd., 15 College Square, Calcutta.

3316 M. F. H., Marwar.—For the stove required you may enquire of Bengal Chemical & Pharmaceutical Works, Ltd., 15 College Square, Calcutta.

3318 K. R. V., Mandi State.—Hardwares may be bought of Empire Hardware & Metal Mart, Bunder Road; Eastern Engineering Co., 481, Bunder Road and D. Maneck & Co., Bunder Road, all of Karachi.

3319 M. M. K. R., Cuttack.—For types and borders enquire of N. N. Sanyal & Sons, 40 Mechua Bazar Street, Calcutta.

3320 L. C. K., Shikarpur.—Process of preserving fruits appeared in January 1927 issue.

3322 M. C. C., Quetta.—Jeweller's tools may be supplied by L. Basack & Co., 5 Old Court House Corner and A. J. Soor & Co., Bagh Bazar, both of Calcutta. Jeweller's tools may be supplied by Hagenmeyer & Kirchner, Berlin C. 19, Germany.

3326 G. D., Dadu.—The companies referred to by you have gone into liquidation.

3327 K. G. P., M., Kandy.—Knitting machines cannot be had at so cheap rate. You may however enquire of Indo-Swiss Trading Co., 27 Pollock Street, Calcutta.

3329 B. D. B., Ludhiana.—You may consult Export & Import Review, 38/39, Krausenstrasse, Berlin S. W. 19; British Trade Review, 113-115-117, Caveron Street, London, E. C. 4 and

Commercial America, 34th Street, Below Spruce, Philadelphia, U. S. A.

3330. S. B. S., Khairha—Wants to be put in touch with purchasers of elephant tusk.

3331. G. S. C., Karachi—You may use Thacker's Indian Directory to be had of Thacker Spink & Co., 3 Esplanade East, Calcutta.

3332. B. V. R. B., Tirupur—There is no spiritual journal known to us. Carbonic acid gas may be supplied by Bishop Babcock Co., Cleveland, Ohio, and Natural Carbonic Gas Co., Newark, New Jersey; both of U. S. A. Addresses of soda water bottle dealers appeared in these columns under No. 3313 above.

3334. S. B. T., Saran—Process of deodorising, coconut oil appeared in April 1922 issue.

3335. B. N. Rohtak—For glass-separating funnel you may enquire of Scientific Supplies Co., 29-36, College St. Market, Calcutta. Wants an expert in hair oil manufacture.

3336. C. M. Dhariwal—For disposing of neem oil and madar cotton advertise in the Sale Exchange pages of **Industry**. Messrs Ramsankar & Co., Kottar, Travancore are agents for many foreign periodicals.

3339. S. S. G., Bikaner—Full address of Messrs Acadian Tobacco Co. is 5 Fairlie Place, Calcutta.

3341. O. M. K., Kuttiana—Process of waterproofing cloth appeared in October 1926 issue. An article on incandescent gas mantles appeared in February 1922 issue.

3343. D. V., Tiruppur—Cinema machines and films may be had of J. F. Madan & Co., 5 Dharamtola Street, Calcutta; Aus Co., Binghamton, New York; Eastman Kodak Co., of New Jersey, Rochester, New York; Pathe Cinema Ltd., Pathe Bldg., Bellard Estate, Bombay; Anima Film Co., 8 New Compton Street, London, W.C.2; Topical Film Co. Ltd., 76 Wardour Street, London W.1; W. Butcher & Sons Ltd., Camera House, Farringdon Avenue, London, E.C.4 and Pasmer George Ltd., 47 Gerrard Street, London, W.1.

3344. A. N. F., Lakhimpur—For manufacturing and colouring porcelain ware you are

referred to an article on Ceramic Industry in July 1925 issue.

3345. S. M. A., Nanded.—Tin boxes may be supplied by Gajanand Ram Pratap, 6 Halsi Bagan Road, Calcutta. Glass phials may be had of S. K. Dey & Sons, 124, Shova Bazar Street and Calcutta Glass & Silicate Works, Belgatchia, Calcutta. For labels enquire of Calcutta Fine Art Cottage, 76 Dharamtola Street, Calcutta. Essences may be bought of D. G. Gore, 31, Mangaldas Road Market, Bombay No. 2. It will be advisable for you to read books on bee keeping and Indian poultry for which enquire of Chackerverty Chatterjee & Co. Ltd., 15 College Square, Calcutta.

3346. S. S. K., Barsi Town.—Gall nut powder and other indigenous ingredients used in ink manufacture may be had of Jadu Nath Ghar, Hukapatty and Banshidhar Dutt & Sons, 125, Khengrapatty; both of Calcutta. Colours may be had of Amin Chand Mehra & Sons, 31, Armenian Street, Calcutta. Chemicals may be bought of B. K. Paul & Co., 1-3, Bonfields Lane and Bengal Chemical & Pharmaceutical Works Ltd. 15 College Square; both of Calcutta.

3347. M. L., Avaranipuducheri—Tamil equivalents of aloes are Anaik-kat razhai and pitha kalabuntha. Tamil equivalents of other ingredients are not known. Process of manufacturing enamel paint will be found in September 1926 issue. A recipe of a colourless finishing varnish will appear in an early issue. A recipe of lice killer appears elsewhere. Your other enquiries are not in our line.

3348. I. C. D., Shikarpur.—For dyeing with fast colour go through the Dyeing Recipes that appeared in August and September 1925 issues of **Industry**. For bleaching and dyeing machinery write to Mather & Platt Ltd., 6, Royal Exchange Place, Calcutta.

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MEDICAL & SANITARY EXHIBITION

The All-India Medical Sanitary and Scientific Exhibition in connection with the 21st Annual Conference of the All-India Medical Licentiates' Association was held in Campbell Medical School, Calcutta during the last week of January, 1927.

The most noteworthy exhibits were the anatomical models of Calcutta Model Works, 6, Shitala Lane, Entally P. O., Calcutta. These are so realistic as to easily mislead even the most scrutinising visitor. Alike in shape, size, proportion and colour shades they are true to nature even to the minutest delineation. We wish this indigenous enterprise every success and strongly recommend their models to all medical institutions. We cannot but speak highly of the ampoules, syringes, hydrometers, etc., of The Cherry Glass Blowing Works, 10 Narikeldanga Main Road, Calcutta whose products are marked by expert workmanship.

A large variety of orthopedic appliances was displayed by Messrs. Paul & Co., 3, College St., Calcutta.

Medical cases of leather thoughtfully designed and decently finished are a speciality of Messrs. W. S. Dossen & Co., Post Box 7864, Calcutta.

Messrs H. Mukherjee & Co., of 39/1, College St., Calcutta, are manufacturers, importers and repairers of surgical instruments. They exhibited some patented articles such as Dr. Das's Midwifery Forceps.

In the manufacture of vaccines, sera and organotherapeutic preparations Bengal Bio-Chemical Laboratory, 35, College St., Calcutta has merited wide recognition. Their other products are trustworthy and efficacious.

The medicinal specialities and pharmaceutical drugs of Bactro-Clinical Laboratory Ltd, Mirzapore St., Calcutta have earned a reputa-

tion all their own. Their biological and injection products are largely in vogue.

Messrs Sarkar Gupta & Co, Ltd., 47, Bosepara Lane, Calcutta, specialise in Electrolytic chlorine which they can supply in an absolutely pure form.

A range of selective vaccines for numerous diseases is prepared by Clinical Research Association, College St Market, Calcutta and by the Bengal Immunity Co, Ltd., 153, Dharamtola St. Calcutta.

The Products of The Bengal Chemical and Pharmaceutical Works, 15, College Square, Calcutta, Messrs B. K. Paul & Co, Bonfields Lane, Calcutta. Messrs Smith Stanistreet & Co., Dalhousie Square, Calcutta, are well known and do not require separate mention. The Neem oil preparation of the Calcutta Chemical Co, Ltd, Ballygunge, Calcutta, can be safely used. The products of Dr. Bose's Laboratory Ltd, 45, Amherst St., Calcutta, comprise tinctures, extracts and the like.

Messrs Adair Dutt & Co, Ltd, 22, Canning St., Calcutta deal in optical instruments and glass apparatuses.

Scientific apparatuses of all kinds, useful chemicals, camera and accessories, photographic materials, etc, may be had of Scientific Supplies (Bengal), Co, 29/36, College St, Market, Calcutta.

Messrs K. C. Bose of Shambazar, Calcutta, manufacture Biscuits, Barley, etc of high quality.

French patent medicines are available of Messrs Raptakos & Prevel, 17, Mangoe Lane, Calcutta.

An assortment of patent medicines such as tonic, etc, is stocked by Messrs Gumbhir & Sircar, 10, Sukea Lane, Calcutta.

Interesting literature relating to Marmite, the vitamin food product are issued by the Sanitarium Food Co., 36, Park St., Calcutta.

Messrs G. W. Carnrick Co., 21, Old Court House St, Calcutta can supply gland products.

NOTICES AND REVIEWS.

Curry Powder.

It pleases our heart to learn that extra fine Curry powder has been prepared by The Pioneer Trading Co., 819, Khadia, Ahmedabad according to a recipe published in December issue of this magazine. As a seasoning agent it will no doubt make the meals palatable and appetising.

Pipe Tobacco.

Messrs Mahamed Freres of Guntur, S. I. are growers, curers and blenders of Virginia leaf tobacco. They have sent us a quantity of piece tobacco (coarse cut) which, to all appearances, is of pure quality.

Woven Labels.

Excellent woven labels are being successfully manufactured by Mr. S R Gupta, C1r No 7, Chitnavis Park, Nagpur City, C. P. Neatly executed in coloured threads these will serve as identification marks on one's clothes.

Useful Badges.

We have had occasion before to refer to the decent badges made by Mr. A R Quereshi, Gujrat, (Pb) A large variety of stock badges and inscription badges are available while badges of special design may be made to order.

Ink Packets.

We have received several sample packets of blue and red ink from Rajasthan Printing Press, Akola, Berar. Dissolved in water the powders yield ink of satisfactory quality.

A Household Remedy.

Mr. K. Peter Paul, 46, Vepery High Road, Periamet, Madras is agent for Nalther Tablets, a household remedy in U. S. A. These aperient tablets are said to be prepared from herbs and efficacious in cases of digestive troubles.

New Year Calendars.

We have much pleasure in acknowledging receipt of a Wall date-card and a calendar from The Ayurvedic Medical Hall Coringa, Godavari Dist.

Messrs P. Gopallaswamy Naidu & Sons, precious stones and jewellery merchants, Saint Thomas Mount P. O. have laid us under obligation with a big-typed calendar.

Our indebtedness to Messrs Seth Deep Chand & Sons, Deepchand Bldgs., Old Sukkur, in respect of a beautiful calendar with tricolour picture received with thanks.

Diary Calendar.

We are in receipt of a very serviceable diary calendar from Messrs S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter St., Beadon St., P. O. Calcutta, manufacturers of Dott's Patent Home Printer and dealers of rubber stamp and block making appliances.

Live-Stock Agency.

It is interesting to learn that the Director, Kishan Zoo and Tannery Co, Bharatpur can supply all kinds of live-stock such as elephants, lions, tigers, giraffe, camel, zebra, rhinoceros, Arab horses and many other wild and domesticated animals.

Safe Deposit House.

A proposal for the establishment of safe deposit house in India has been made by Mr. J C. Basak, 363, Upper Chitpur Road, Calcutta. It will be seen in the memorandum he has submitted that such houses are in vogue in England where all kinds of deeds, securities, jewellery and other valuables may be deposited on payment of proper fees. The proposer advocates the inauguration of similar houses in the various towns of this country so that the wealth of the people may be easily safeguarded whenever desired.

• TRADE ENQUIRIES.

[To communicate with any party write him direct with name and address given below, mentioning **Industry**]

3062. The Eastern Company, Bezwada.—Desire to be put in touch with suppliers of gunnies, hessians, Java sugar and wheat flour and can supply groundnuts, tobacco, turmeric and wollen carpets.

3147. The Kashmir Industrial Export Mart, Srinagar, Kashmir. Desire to be put in touch with dealers in embroidery and shawls

3151. The Director Kishenzoo and Tannery Co., Bharatpur State.—Wants a loan of Rs. 60,00,000 for welfare of an independent Rajputana State.

3174. Fazil Brothers, 65, Alexandra Road, Secunderabad.—Desire to be put in touch with buyers of salted sheep casing and dried guts of sheep.

3198. India Products Export Co., P. O. Box No. 217, Madras.—Want to be put in touch with dealers in canes with root, whisk root or broom stick and dried ox blood

3210. S. Pattabhiramaiah, Rajahmundry, Godavari Dist.—Desires to be introduced to merchants dealing in indigo.

3253. C. Balajee Rao, Coimbatore.—Wants to be put in touch with suppliers of fancy neckties of cotton silk

3260. A. N. Krishna, 125, South Mas Street, Madura.—Can supply stained glass substitute.

3286. Commercial Products Syndicate, 441, Beadon Row, Calcutta.—Can supply linseed oil, cotton seed oil, mohwa oil and other cakes in very large quantities

3298. K. Mahanood Baek, Kanadu Kathan, Ramnad.—Wants services of a man in Madras who can translate German into English.

3302. K. J. Kapadia & Co., 179, Hornby Road, Fort, Bombay.—Want to be put in touch with supplier of silk waste.

3364. Shiba Prasad Sarkar, Chaibassa, Singhbhum.—Wants to be put in touch with dealers in palwal (Patole).

3400. The Madras Book Depot, Nagaji Rao Street, Triplicane, Madras.—Wants a capitalist with Rs. 5,000 to invest in a book publishing concern.

3405. M. V. S. Md. Abdul Shukur Co., Cuddapah.—Want to be put in touch with indigo merchants of Punjab and Kabul.

3422 B. Chas. Fernandez C/o Messrs Gregson Batley & King, Chartered Bank Bldg., Fort, Bombay.—Wants to be put in touch with suppliers of lazulite.

3423. Ramesh Chandra Das Gupta, Matta, Dacca.—A match and soap expert seeks a suitable employment.

3445. S. Banerjee, 11, Kasi Bose Lane, Beadon Street P. O., Calcutta.—Can supply, lac dye in large quantity.

MARCH ISSUE OF INDUSTRY.

(In the Press)

The March Issue of Industry which will be published by the end of the month will contain among other things articles on Flax Products, Embossing etc besides the usual features Small Trades & Recipes, Formulas & Processes, Brief Queries & Replies. Any friend of our subscriber may get a sample copy free on application to the Manager, Industry, Shambazar, Calcutta

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Those interested should send in their orders for a copy of INSPIRING CONCEPTIONS, etc., in the next issue.

WE REMIND OUR SUBSCRIBERS IN THIS CONNECTION THAT THEIR SUBSCRIPTIONS ARE CLOSING WITH THIS ISSUE AND UNLESS NEW SUBSCRIPTION IS CREDITED IN THE MEANWHILE OR AN INTIMATION TO THE CONTRARY SENT TO US APRIL ISSUE WILL GO TO THEM BY A. P. P. WHICH WE HAVE EVERY HOPE OF BEING ACCOPIED

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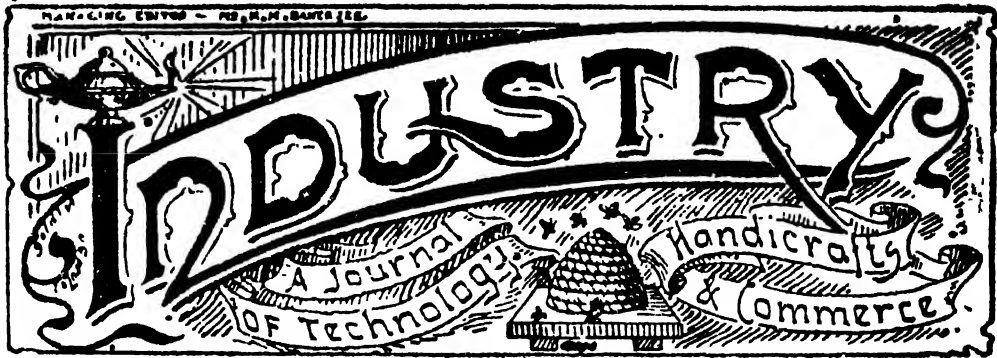
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VOL. XVII.

CALCUTTA, MARCH, 1927.

NO. 204.

LIGHT, MORE LIGHT !

Light, More Light! Thus exclaimed a great philosopher towards the close of his career. Even after life-long study he was hankering after knowledge—more and more.

Yet another noted scientist confessed that he was merely collecting pebbles on the shore of the ocean of knowledge—its vast expanse was lying beyond unfathomed.

Many are the readers of **INDUSTRY** who have expressed themselves similarly—and among them may be counted some of the oldest and most studious of its subscribers. They want to learn more about the industrial progress of India. They want to be acquainted with the potential resources of the country—its immense manufacturing possibilities.

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Evidently their inquisitiveness has been enkindled. It is a healthy sign. It will lead them on to prosperity.

For seventeen long years **INDUSTRY** has been serving its clientele in diverse ways. It has lighted the path of many of its readers. It has tried to remove darkness from many an obscure corner. It has thrown a flood of light on many of the economic questions of the day. It has shown the new light in co-operation. It has endeavoured to lighten the burden of unemployment.

In the past, like a search-light, **INDUSTRY** has probed into the current industrial problems year after year. In the future, let it serve as the beacon-light of progress to the aspiring industrialists of India.

MANUFACTURE OF GLASS.

SILICON, the essential element of flint, quartz and rock crystals will, at a high temperature, enter into combination with the oxide of several of the metals and earthy elements forming a silicate, which on cooling, becomes an amorphous transparent substance to which the name "glass" is applied.

The quality and appearance of the product differ very considerably according to the materials used in the preparation, so that in classifying the various sorts of glass, the difference in the ingredients as well as in the mode of manufacture will have to be taken into consideration.

The two most familiar forms in which glass is presented to us are, in bottles, from the common dark green one used by the wine merchants upto the elegantly moulded and cut carafe, and in windows, where the difference is almost equally great between the little bull's-eyed panes and the large polished plates. It will be convenient to follow these two grand divisions, alluding by the way, to the descriptions of less general importance.

We begin with green bottle glass, in which the commonest materials are used, and the simplest process is adopted as cheapness is an important consideration in this manufacture. The ordinary ingredients for this description are ferruginous sands, yellow marl, and cullet (which is glass waste from former meltings), with some kelp or wood ashes, or the residues from the soap and

soda works. The sand and marl, will both supply silica and oxide of iron, and the marl, lime and alumina in addition while the ashes or soap maker's waste will furnish potash or soda. The relative proportions of the several ingredients vary considerably in different factories, but the weight of the alkalis should be something more than double that of the sand and marl together. The iron contained in the two latter facilitates the combination as it acts the part of a flux, but to it is due the dark colour common to this sort of glass. Sands entirely free from the presence of this metal are rare, and therefore expensive, they are consequently reserved exclusively for the manufacture of colourless glass. Before use the sand is dried, and then sifted to remove any extraneous substances; the clay or marl is also thoroughly dried and reduced to the state of powder, lime or chalk, treated in the same way, is often substituted for the latter if the sand employed is argillaceous in character.

The materials being all intimately mixed together, are put in the melting pots to be fused. These are large vessels made of clay, open at the top, and tapering slightly downwards so that in shape they resemble very closely a common garden pot, only that they have no rim. In size, those used for crown or plate glass-making are about 4½ feet high, 3 feet in internal diameter at the base, widening to 3½ feet at the top but in the special manufacture described

here, they are usually made smaller, being about 3 feet in height, and the same in extreme width. As the making of the pots themselves forms a part of the business of the glass works, and the success of the establishment depends in no considerable degree upon the care exercised in their manufacture, this operation is described first.

The very best refractory clay should be used in making pots, the nearer it approaches to a pure silicate of alumina the better, but the presence of lime and pyrite is specially to be avoided. The clay should be moistened with water and thoroughly kneaded with one old pot finely ground, until its composition becomes thoroughly uniform. It is then rolled out into small lumps and these are used for building up the pot by being pressed intimately together by the hands of the workman, whose great care is not to leave any air bubbles between them. The pot is then transferred to the drying room, which is heated to about 100 F. and it is left there for many months to dry. When ready and required for use it is removed to a reverberatory furnace to be annealed when in the course of several days it is very gradually warmed up to a bright red heat, and while at that temperature it is rapidly transferred to its ultimate position in the glass furnace. When it has been there a sufficient time to have got up to its full heat, it is glazed by throwing in a little cullet, and is then ready for use.

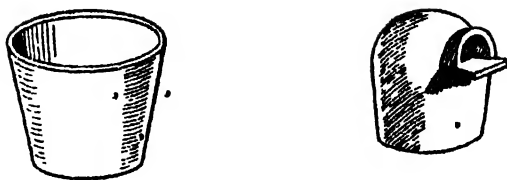


Fig 1. Crucibles for Glass Melting.

A very intense heat is required for fusing the mixture described above, and therefore, with the object of economising fuel, the furnace is so constructed as to heat several pots at the same time, the fire place being in the centre with the pots around it. The draught is supplied from a vaulted chamber beneath the floor of the glass house, in the arch of which fire bars of the grate are placed. The furnace is covered above with a vaulted roof enclosing the pots, the flues being so placed that the heated gases must pass all round the sides of the pots before they can escape up the common chimney.

The pots are filled up with the mixed materials which gradually sink down as they melt more is then added until the pot is nearly full of melted material as it is always called by the workmen. During the melting the carbon which may be present in the clay or alkali is converted into carbonic oxide, the ebullition caused by the escape of which gas greatly facilitates the intimate mixture of the several ingredients, and so prevents the glass from presenting a streak appearance. This is a matter of special importance when preparing the finer qualities, and in

order to aid the escape of this gas, without which the glass when made will be found to be full of bubbles, the greatest possible heat is maintained for a short time, so as to render the metal quite limpid. After this the fire is lowered so that the glass may thicken again into a viscid mass, and thus become in a condition to be worked.

The more mechanical part of the process—that of giving the glass a form—is now arrived at, and it will here be necessary first to prescribe the principal tools and appliances used by the glass blower and his assistant. The most important of all is the pipe, a hollow iron tube about $4\frac{1}{2}$ feet long, with a mouth-piece at one end and a small knot at the other; a solid iron rod of about the same dimension, called a punty, different forms of tongs made with a slight spring, a large pair of scissors; an arm chair, the arms of which are quite straight, and extend for some distance in front of the seat; and a low table, the top of which consists of a slab of polished iron. In addition to these, moulds of various shapes are generally used, in order to secure uniformity in the size and shape of the bottles produced.

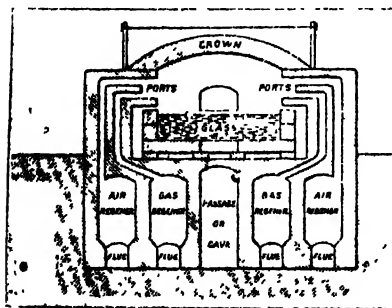


Fig. 2. Sectional Diagram of Tank Furnace

The pot having been skimmed of the impurities (called glass-gall or sandiver) which will be found floating upon the surface of the metal, the end of the pipe (having first been heated) is dipped in, and a quantity of metal is gathered round the knob, sufficient to produce the kind of bottle that may be required. The blower then takes the pipe, and blows down it into the metal, which will thus assume a hollow balloon shape; by rolling it upon the table he flattens the sides; with the tongs he compresses and shapes the neck rapidly twirling the pipe round at the same time by rolling it upon the arms of his chair with his left hand; and then he puts it into the mould and blows into it again to give it the final shaping. The bottle so far made is then taken up by the finisher by applying the punty, tipped with a little hot metal from the pot, to the bottom of it; and then it is detached from the pipe by the touch of a piece of cold iron or a little water. The finisher then reheats the neck of the bottle at the working hole of the furnace, as by this time the metal has considerably cooled down, shapes the neck properly inside as well as outside, and taking a small piece of fresh metal he twists it round the top and completes the rim. The bottle is then carried off by a worker to the annealing oven to cool and by a slight jerk it is disengaged from the punty.

The whole operation has of necessity to be done very quickly, and a rapid rotatory motion has to be maintained throughout, in order to prevent the glass from collapsing, or even dropping into an oblique form, in which case the bottle

when finished would not stand upright. Rotation round the pipe as the axis will tend to make the bottle wide and flat; if a long and narrow form should be required, the workman can readily produce it by holding the pipe at the mouth piece, and swinging it all bodily round in a large circle with his shoulder as the centre.

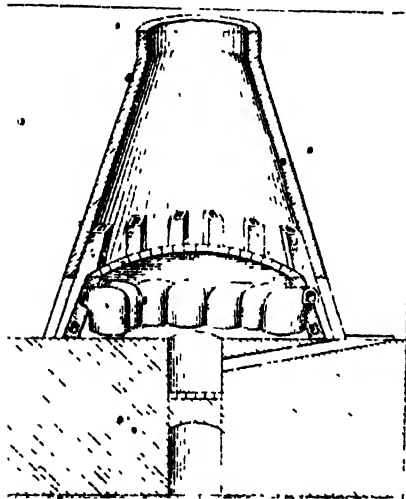


Fig. 3. Interior of Another Type of Glass-Melting Furnace.

Many bottles are made without the use of a mould, in which case the process is precisely the same as that detailed above, with this single exception: the blower judging by the eye as to the size and form to be given to it.

The annealing oven yet remains to be described. Were the glass to cool rapidly it would be so extremely brittle as to be absolutely useless, and thick glass especially would be liable to fly to pieces, in consequence of only slight change of temperature. The reason of this seems to be pretty apparent, and the

cure simple and effective. Like other substances glass contracts in cooling, though relatively less so than most of the metals; as compared with them, however, its conductivity for heat is singularly small.

The annealing oven is therefore so constructed that the greatest heat shall be near the door through which the bottles or other glass wares are passed in, with a gradual reduction in temperature towards the door at the other end where the goods are taken out. These ovens are frequently made in the form of a long low arch way, sometimes sixty feet in length, with a furnace at one end only, where the heat is almost sufficient to melt glass. Here the goods are inserted and the draught is directed through the tunnel, so that the parts more remote are only heated by the surplus heat from the front, the glass is made to pass slowly through the tunnel, the tray on which it stands being worked by an endless chain, and the speed being regulated according to the kind of goods to be annealed.

For small phials and the ordinary colourless glass more care is taken in the selection of the materials, and containing iron and alumina being carefully avoided. Fine white sand, well washed, is used, with potash, soda, lime, and white cullet. A little oxide of manganese is often added, to assist in the oxidation of any ingredients which might otherwise give a shade of colour to the glass.

That quality, however, which is known as flint glass or crystal, and which

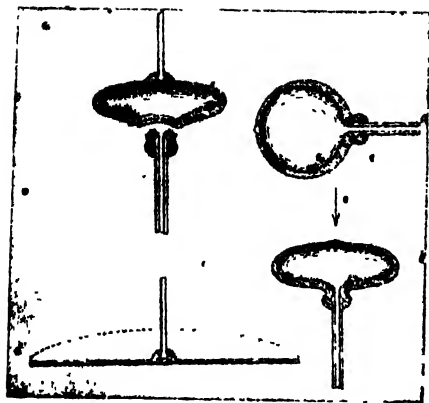


Fig. 4. Stages in Crown Glass Making.

includes all the ornamental colourless cut ware, has quite a different composition. It is a double silicate of potash and lead. The presence of the lead salt greatly heightens the brilliance of the glass, renders it more readily fusible, and softer. The use of soda is always avoided, because with lead it will impart a slight tint to the glass. The double silicate of potash and zinc is also found to have the same properties, but the manufacturers generally adhere to the more familiar combination. The most approved proportions are —

Carbonate of potash	1 cwt
Oxide of lead	2 „
Burnt sand	3 „
Nitrate of potash	14 to 28 lbs
Oxide of manganese	4 to 12 oz

Lime to which pure flint cullet can be added at discretion.

A much lower temperature will suffice to fuse this mixture; and advantage is taken of this circumstance in using covered instead of open pots, by which the risk of any impurities falling

into them during the melting is entirely obviated. A larger number of pots can also be heated with one fire.

The greatest possible care has to be taken so that all the ingredients are as pure as they can be made. The lead salt is specially prepared for glass-maker's use. The best white sand is first washed several times, and then burnt to remove all chance of impurities. The carbonate of potash is dissolved and re-crystallised, with the same object. From such ingredients a pure metal will be obtained, without even any sandiver floating on the surface; so that the operation of skimming has not to be performed.

Flint glass is cut or ground by being brought into contact with discs of metal or stone which revolve on a lathe. The face or edge of the discs is varied according to the form of cut required, and fine sand or emery mixed with water is supplied to the grinding surface from a hopper above, the former for rough work, and the latter for fine grinding. For polishing, a wheel of stone is first used to take out the coarsest scratches, and then one of pipe-wood dressed with rotten stone, and subsequently for the finest work, with putty powder.

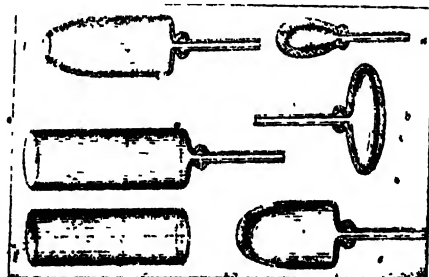


Fig. 5. Stages in Sheet Glass-Making.

EMBOSSING.

EMBOSSING is the art of producing raised portions or patterns on the surface of metal, leather, textile fabrics, cardboard, paper, and similar substances. Strictly the term is applicable only to raised impressions produced by means of engraved dies or plates brought forcibly to bear on the material to be embossed, by various means, according to the nature of the substance acted on. Thus raised patterns produced by carving, chiselling, casting, and chasing or hammering are excluded from the range of embossed work. Embossing supplies a convenient and expeditious medium for producing elegant ornamental effects in many distinct industries, and especially in its relations to paper and cardboard its applications are varied and important. Crests, monograms, addresses, etc., are embossed on paper and envelopes from dies set in small hand screw presses, a force or counter die being prepared in leather faced with a coating of gutta-percha. The dies to be used for plain embossing are generally cut deeper than those intended to be used with colours. Colour embossing is done in two ways—the first and ordinary kind being that in which the ink is applied to the raised portion of the design. The colour in this case is spread on the die with a brush, and the whole surface is carefully cleaned, leaving only ink in the depressed parts of the engraving. In the second variety—called cameo embossing—the colour is applied to the flat parts of the design by means of a small printing roller, and the letters or design in relief are left uncoloured. In embos-

sing large ornamental designs, engraved plates or electrotypes therefrom are employed, the force or counterpart being composed of mill-board faced with gutta-percha. In working these, powerful screw-presses, in principle like coining or medal-striking presses, are employed. Embossing also is most extensively practised for ornamental purposes in the art of bookbinding. The blocked ornaments on cloth-covers for books and the blocking or imitation tooling on the cheaper kinds of leather work, are effected by means of powerful embossing or arming presses. For impressing embossed patterns on wall papers, textiles of various kinds, and felt, cylinders of copper, engraved with the patterns to be raised, are employed, and these are mounted in calender frames, in which they press against rollers having a yielding surface, or so constructed that depressions in the engraved cylinders fit into corresponding elevations in those against which they press. The operations of embossing and colour printing are also sometimes effected together in a modification of the ordinary cylinder printing machinery used in calico printing, in which it is only necessary to introduce suitably engraved cylinders. For many purposes the embossing rollers must be maintained at a high temperature while in operation; and they are heated either by steam, by gas jets, or by the introduction of red hot irons within them. The stamped or struck ornaments in sheet metal, used especially in connection with the brass metal trades, are obtained by a process of embossing hard steel dies with forces or counter-

parts of soft metal being used in their production. A kind of embossed ornament is formed on the surface of soft wood by first compressing and consequently sinking the parts intended to be embossed, then planing the whole surface level after which, when the wood is placed in water, the previously depressed portions swell up and rise to its original level. Thus the embossed pattern is produced which may be subsequently sharpened and finished by the ordinary process of carving.

DYEING YARNS FOR CARPETS AND RUGS.

CARPET yarn dyeing is one of the most important branches of the dyers' art, and in mills which maintain an active force of designers, is one of great responsibility, since both dyers and designers must work in close harmony to produce the best results. Of first consideration is the proper preparation of the several grades of yarns for dyeing: the best colourings are only to be secured upon yarns that have been thoroughly scoured and even in some instances after having been given a partial or thorough bleaching. Where the shades desired are to be particularly clear, bleaching is desirable.

Generally carpet and rug yarns are dyed in rotary dyeing machines, although large quantities are still dyed in the old type, open-top dye tubs, the yarn being turned by hand. The choice of dyes is restricted to those of the acid dyeing group, which, fortunately comprises dyes that are not only fast to light, a most desirable feature for floor coverings, but also possess good level dyeing properties.

These groups of acid dyes permit the dyer to produce a very wide range

of shades to which may be added the acid dyes that are recommended for the production of full heavy shades.

As a rule, the working dyer succeeds in producing an extensive line of shades with comparatively few dyes, and this goes a long way when it comes to matching or duplicating shades. The average make-up of a dye bath for carpet yarns dyeing is about as follows:-

The bath is prepared with the necessary quantity of dye for the desired shade, and from 4 to 6 per cent. oil of vitriol, 20 per cent. Glauber's salt crystals.

The yarn is entered at 180°F., raise the bath gradually to the boil and boil for one hour. Usually the bath has exhausted by the time boiling is effected. During the raising of the temperature, the yarn should be kept in slow, but constant motion to ensure both levelness of shade and penetration.

When dyeing with any of the dyes recommended for the production of full heavy shades, it is advisable to add the oil of vitriol in successive portions, for the reason that no claims for level dyeing are made for these particular dyes. It is also desirable not to enter the yarn at a temperature much above 102°F., but gradually raise it to the boil as the bath exhausts.

Washing of the dyed yarns is necessary. If this is not attended to in a thorough manner, traces of oil of vitriol are likely to remain in the yarn, which will positively cause injury to the wool during the drying. Numerous instances of an apparent weakening of the yarn have been traced directly to the presence of oil of vitriol remaining after dyeing, and not having been rendered by proper washing.

FILAMENTS FOR INCANDESCENT LAMPS.

MOST lamp factories employ for the filament of incandescent lamps a solution of cellulose in one form or another. (1) A large number use cotton wool or wood fibre dissolved in chloride of zinc. (2) Some use cotton converted into gun-cotton and dissolved into collodion. (3) Others, again, use cotton converted into gun-cotton and dissolved in acetic acid. It is equally interesting to note that every factory ejects each of these solutions through graduated jets and a liquid capable of "setting" the solution of cellulose into a semi-solid gelatinous thread. The various processes are described below.

ZINC-CHLORIDE PROCESS

Pure zinc-chloride with acid reaction is dissolved in water to a specific gravity of about 1800. This solution is then placed in vessels where it can be maintained at a temperature of between 70°C and 100°C., which is best accomplished by means of a water jacket. To the above heated zinc chloride solution best bleached cotton wool or Swedish filter paper cuttings, weighed out in a well dried condition are added in the following proportions:—To 1000 cubic centimeters of zinc-chloride solution are added from 80 to 160 grammes of cotton wool, the quantity varying with the temperature of the solution, the diameter of the final thread, time of solution, etc. To hasten solution, this mixture should be stirred from time to time, and when the solution is of a uniform smoothness

and of the consistency and appearance of treacle it should be withdrawn from the dissolving pans into glass flasks. These are placed in a water bath and are provided with stoppers with two holes. In one of these holes is inserted a pipe connected with a source of vacuum, and in the other a pipe leading down to the zinc-chloride solution of cellulose (or mass). Means are used to secure the thorough filtering of the mass during its passage into the flasks. When these are about two-thirds full the feeding pipe is disconnected and the mass in the flasks is kept under a vacuum, whilst the heat is maintained at between 70° to 90°C. The vacuums, which should be as good as possible removes all—air bubbles and uncombined water. All bubbles having disappeared, the vacuum is removed and the mass when cold and resembling clear thick treacle is ready for squirting through jets. For this operation the flasks containing the cold mass are each fitted with two tubes—one connected to a source of air pressure, which must be kept constant and be able to be regulated to any desired amount; the other, leading to the bottom of the flask, connected by distributing-tubes to various arms terminated with fittings to which are attached the vertical graduated jets. Through these tubes and jets the mass is forced by air pressure. The jets, carefully gauged and proportioned in diameter to the various diameters of filament required, are now arranged over tall glass cylinders which contain the setting fluid—a mixture of methylated alcohol of full strength with an admixture of hydrochloric acid. The hydrolysed

cellulose mass is dehydrated by means of the alcohol. Coagulation having thus been caused the mass issues from the jets in a colloidal state and possessing a certain amount of strength. It falls as a continuous thread to the bottom of the cylinders, where it winds itself in a continuous hollow spirel. The thread is then carefully removed from the cylinders and passed through baths of alcohol, acid and water and by means of the acid any oxychloride of zinc is removed.

The wet thread is now wound on drums, or other arrangements, where it can freely contract as it dries. When dry the resulting material should be transparent, round, and strong, somewhat resembling a clear violin string. In this dry state the filament material is quite strong and lends itself readily to being wound on the carbon blocks or formers used for carbonising the dried mass. Some makers place the filtered mass in a taper flask with a jet or jets at the lowest part, the air-pressure being introduced through a joint at the upper part of the flask.

COLLODION PROCESS.

Collodion filaments are prepared from a 4 to 5 per cent collodion solution—that is, a solution of pyroxaline or gun-cotton in alcohol ether. This solution is poured out on to carefully-levelled glass tables, the edges are built up with strips of metal of thicknesses varying according to the desired thickness of the resulting material. The glass sheets are built one upon another, and fitted with arrangements to catch the candied collodion. The

whole is allowed to evaporate slowly and when set the resulting sheet are stripped off and cut on a mandrel to the width necessary to suit the various sections of filaments required. The sheets previous to cutting are denitrized by being boiled in a solution of ammonia sulphide and should then be well washed before being allowed to dry. This material, when carbonized in the usual manner, produces filaments with a highly lustrous surface, but of square section which are consequently difficult to gauge as to cross sectional area.

ACETIC-COLLODION PROCESS.

To prepare filament by the acetic collodion process a 4 per cent collodion must be poured on smooth glass plates and left to set. When set it is cut into small pieces and allowed to dry in the air for about twenty-four hours, until all smell of ether has disappeared.

The next step is to put this dried product into glass vessels and cover it with glacial acid of 99 per cent strength. The vessels covered with glass plates are left for about twenty-four hours, after which the excess of acetic acid is poured off, and the remaining glutinous mass of collodion is well stirred until it becomes of the consistency of thick treacle. This mass is now exhausted to a vacuum of from 35 to 55 centimeters pressure, after which it is ready for squirting in a weak alcohol solution. When squirted it is washed and wound in a drying frame, dried, and tied hanks preparatory to being denitrized. Having remained about twelve hours in this bath it is boiled in it, washed with water until colourless, and finally dried on frames.

The dried material is very strong, and ready for winding on the carbon forms or blocks for carbonization. By adding gelatine to the above acetic solution of gun-cotton (pyroxaline) a mass is obtained which has the property of "setting" in perfectly cold water, and the subsequent treatment of this material is the same as that just described.

The chief advantages of these squirting processes are that the resulting filaments are structureless, and of equal specific resistance throughout their section and length.

IMITATION STONES.

IN the manufacture of the glasses for imitation "paste" jewels, every effort is made to procure pure materials and colorific oxides. The base for making artificial gems is a very heavy lead crystal glass termed "Strass paste" which gives great brilliancy and refraction. The composition of such a paste is:

	By Part
Best white sand	100
Pure red oxide lead	150
Dry potash carbonate	30

These are thoroughly well melted until clear and free from seed, and the molten mass ladled out of the pot and quenched in cold water, or "de-graded." This assists in making the paste homogeneous. After repeated melting and degrading, the paste or cullet is collected, dried, and crushed for use in making the coloured pastes. Usually this strass metal is melted in small, white porcelain crucible pots holding about 5 to 10 kilograms of the metal and heated in a properly regulated gas and air injector furnace. The coloured paste is kept in fusion for a whole day after which it is

slowly cooled and annealed within the pot, and the gems cut from the lamps of glass thus obtained. The following are some of the compositions used in the preparation of the respective gems.

Opal.

	By Parts.
Powdered strass paste	1000
White Calcium phosphate	200
Uranium Yellow	5
Pure Manganese oxide	3
Antimony oxide	8

Ruby.

	By Parts
Powdered Strass paste	1000
Purple of Cassins	1
White oxide of tin	1
White oxide of tin	5
Antimony oxide	10

Emerald.

	By Parts
Powdered Strass glass	1000
Green chrome oxide	1
Black copper oxide	8

Sapphire.

	By Parts.
Powdered strass glass	1000
Pure cobalt oxide	15

WHAT TO ADVERTISE?

What are the new things that ought to be advertised? Here are a few of the things that ought to be advertised in the future:—

1. The advantages of living in the country.
2. The joy of work.
3. The dangers of having too many lawyers in Legislative Councils.
4. The advantages of buying trade marked goods.
5. The need of teaching people how to be more hygienic.
6. The necessity of a better spirit in industry.

CITRIC ACID.

CITRIC acid exists in the juice of fruits, especially the lemon, orange, currant and quince. It may be procured from lemon juice in a pure state by the following process

Lemon-juice is put into a large tub, and saturated with dry chalk in fine powder noting carefully the gravity employed. The citrate of lime which precipitate being freed from the supernatant liquor is to be well washed, with repeated affusion and decantation of water. For every ten pounds of chalk employed, nine and a half pounds of sulphuric acid diluted with six times its weight of water are to be poured while warm upon the citrate of lime, and well mixed with it. At the end of twelve hours, or even sooner, the citrate will be decomposed, dilute citric acid, will float above, and sulphate of lime will be found at the bottom. The acid being drawn off, the calcareous sulphate must be thrown on a canvas filter drained and then washed with water to abstract all the acid.

The citric acid thus obtained may be evaporated in leaden pans, over a naked fire, till it acquires the specific gravity 1.13 after which it must be transferred into another vessel, evaporated by a steam or water bath till it assumes a syrup aspect, when a pellicle appears first in patches, and then over the whole surface. This point must be watched with great circumspection, for if it be passed the whole acid runs the risk of being spoiled by carbonisation. The steam or hot water must be instantly withdrawn and the concentrated acid put into a crystallising vessel in a dry but

not very cold apartment. At the end of four days the crystallisation will be complete. The crystals must be drained, re-dissolved in a small portion of water, the solution set aside to settle its impurities, then decanted, re-evaporated, re-crystallised. A third or fourth crystallisation may be necessary to obtain a colourless acid.

If any citrate of lime be kept undecomposed by the sulphuric acid it will dissolve in the citric acid, and obstruct its crystallisation and hence it will be safer to use the slightest excess of sulphuric acid than to have any citrate undecomposed. There should not, however, be any great excess of sulphuric acid. If there be, it is easily detected by nitrate of baryta not by the acetate of lead as prescribed by some authorities; because the citrate of lead is not very soluble in the nitric acid, and might thus be confounded with the sulphate, whereas citrate of baryta is perfectly soluble in that test acid. Sometimes a little nitric acid is added with advantage to the solution of the coloured crystals, with the effect of whitening them.

Twenty gallons of gold lemon-juice will afford fully ten pounds of white crystals of citric acid.

Citric acid crystallises from a cold saturated solution in prisms belonging to the rhombic system. If, however, the crystals be deposited from a hot solution, they present different forms, and contain only one half the normal proportion of water. The sp. gr. of the crystals of citric acid is 1.617. They are unalterable in the air. When heated they melt in their water of crystallisation, and at a higher heat, they are decomposed.

RUBBER LATEX IN PAPER MAKING.

THE history of writing is the history of writing materials. From age to age these materials have changed. From the clay tablets of Babylon we pass to the parchment and papyrus of classical antiquity and the medieval scribes, and from them to the modern paper.

The latest application of that wonderful harmoniser of life, rubber, is its application to paper manufacture in the form of rubber latex. Rubber latex is a natural solution of rubber in a liquid form, miscible with water in all proportions. By using rubber in its liquid form, i.e., before coagulation, it may be mixed with paper-making fibre without the mechanical or thermal energy required in the solid product.

The use of rubber latex in paper making is a comparatively simple process. The great essential is the thorough dilution of the latex with water before addition to the beaten pulp. In this manner the latex quickly penetrates into and becomes intimately associated with every particle of the beaten fibre. Experiments may be conducted as to when to add the latex to the fibre during the process of beating. The coagulation of the rubber is often a comparatively simple matter. In some cases, as with a sulphite pulp, and when small proportions of latex are needed, the fibre will take up the coagulated rubber without the addition of a coagulative agent. In many experiments such salts as magnesium sulphate have been used as the coagulative agent, and in others such

acids as acetic acid. In most cases it is best to use alum exactly as in ordinary paper-making processes. Where the paper has to be tub-sized, alum can be used as the coagulative agent. Where the paper is machine-sized the latex may be added before, or after, the size and alum, the condition being that sufficient alum is added to throw out the size and rubber completely. It is important that with an alkaline pulp the final condition is made faintly acid to prevent loss of rubber latex in the back water.

The use of rubber latex in paper making opens up some interesting problems for study and explanation.

Rubber latex has some specific effect upon the fibres in the beating engine and upon the rate of hydration of the fibres. It is in this direction that the value of rubber latex as a cheapening factor in paper production will be fully seen when large supplies of latex reach the paper-making countries, so that all phases of the effect of rubber latex can be explored in the mills on a wide and continuous scale. There is every evidence that rubber latex, even in small quantities, accelerates the rate of hydration.

In rubber latex we have colloidal particles electrically charged, and if these are attached to the cellulose fibres a new electric condition of the fibres in relation to the water medium is produced which increases the affinity of the groups for water and the rate of hydration is intensified. As a result of all this, fibres in the paper made with a furnish to which has been added small or larger amounts of rubber latex are often closer and

more uniform in texture than a paper of the same fibre made without rubber latex.

Sometimes a paper is made of remarkable strength, but lacking in elasticity; then the right proportion of rubber latex will help in this case. A paper may be too weak or made largely of waste paper; here rubber latex will give necessary strength.

The use of rubber latex in increasing the folding number is a very wide one for all grades of paper. Practical commercial experiments in many mills have shown that all grades and qualities of paper can be improved in some regard by the use of rubber latex.

Experience shows that all kinds of fibres—vegetable, animal, and such mineral fibres as asbestos—may be used in paper to which is added rubber latex. The paper mills have made paper containing rubber latex to give the finest qualities of cotton and linen papers, such as vellum and ledger paper, banks, etc. Various grades of tissue have been made and are being further experimented upon. Paper for electrical purposes and ammunition case paper has been made in quantities.

Many kinds of wrapping paper have been manufactured, both made from entirely new fibre and wholly of very cheap waste. Experiments are proving that excellent results may be produced with waste paper, so it looks as if the value of this material for paper making stock will be enhanced.

The application of rubber latex to paper making will not only give a ready means of improving the quality of paper, but by cheapening paper productions, it will open out many new fields for the use of paper, and thereby the paper industry will greatly prosper and benefit by the process.

—Journal of the Swedish Chamber
• of Commerce

FLAX PRODUCTS.

AS is wellknown flax is chiefly grown for linen and similar products. It may be utilised in many other ways.

When flax is grown for seed only the straw is frequently used for stable bedding, to thatch a roof, or sometimes for forage when hay is scarce. A small portion of the flax straw produced in America is used for paper stock and in a few localities it is made into upholstery tow. The tow wastes made in the spinning mills are used to produce felt and paper, the best qualities proving most useful in the production of cigarette and grease-proof butter papers.

A product resembling cotton wool may also be made from flax tow and waste by thoroughly bleaching the fibre and reducing it to pure cellulose and then carding it. It is said to be cooler and more antiseptic when applied to wounds, than cotton wool.

In fields of action flax tow is used not only to stop the flow of blood from wounds, but also to clean germs. To render it antiseptic it may be carbolized before carding by the application of carbolized oil.

The woody part of the flax straw, may be burned in the furnace to produce steam and save coal. Short waste flax fibres are also useful in fibrous plaster and as binder in boiler covering compositions. As flax gaskin, thick, soft, twisted flax yarns are most useful to the plumber and hydraulic engineer for packing the joints of water mains, etc. Flax is also a most useful material for the manufacture of "grum-mets" as used by engineers, and ship builders, to encircle bolts, lying like a ring underneath the washer, and producing a water or steam-tight joint. Soft d-y spun yarns are also largely used in the manufacture of plaited engine and pump packings, being usually saturated with tallow, plumbago, etc.

Pure flax cellulose can also be used in the production of artificial silk, celluloid, xylonite and similar products, either by the cupra-ammonia or viscose process.

Small Trades & Recipes.

Transparent Paint for Glass.

A shellac varnish made of bleached shellac can be used with various aniline dyes. The glass should be warm, but the varnish is used cold. If the whole of the glass is to be coated, the method is to pour the coloured varnish on and drain it off at a corner. Another method is to mix 1 part turpentine with 2 parts of venice turpentine and rub into this Prussian blue, Crimson lake, India yellow or any mixture of these to produce the shade required. Care should be taken to mix the colour and the liquid intimately.

Chalk White for Canvas Shoes.

Pipe clay,	16 oz.
Spanish whiting	8 oz.
Flake white	6 oz.
Precipitated chalk	4 oz.
Powdered Tragacanth	2 oz.
Carbolic acid	2 dr

Mix the powders and knead with water. Divide the paste into small pellets and cast each into suitable moulds

Brown Boot Polish.

Yellow wax	4 oz.
Pearl ash	4 dr
Yellow soap	1 lb
Spirits of turpentine	7 oz
Phosphine (aniline)	4 gr.
Alcohol	4 dr.

Water, a sufficient quantity.

Scrape the wax fine and add it, together with the ash and soap, to 12

oz. of water. Boil all together until a smooth, creamy mass is obtained; remove the heat and add the turpentine and the aniline (previously dissolved in the alcohol). Mix thoroughly, and add sufficient water to bring the finished product up to 1½ pint.

Red Sealing Wax.

Take shellac (very pale) 4 oz.; cautiously melt in a bright copper pan over a clear charcoal fire, and when fused add venice turpentine, 1½ oz.; mix, and further add vermillion, 3 oz.; remove the pan from the fire, cool a little, weigh it into pieces, and roll them into circular sticks on a warm marble slab by means of a polished wooden block; or it may be poured into moulds while in a state of fusion. Some persons polish the sticks with a rag till quite cold.

Eczema Ointment.

Lime Oxide	2 oz.
Calamine	2
Boric Acid	2
Hard Paraffin	1
Soft Paraffin	16
Carbolic Acid	120 grs.

Eucalyptus Embrocation.

Oleic Acid	4 fl. oz.
Oil of Turpentine	36 "
Solution of Ammonia	12 "
Solution of Potash	6 "
Eucalyptus Oil	3 "
Water	80 "

INDIA'S INDUSTRIAL PROGRESS.

Gold Field in Patiala.

It is reported that an extensive gold deposit has been located in Patiala territory near Narnauli. It is believed that the auriferous area is about 12 to 26 sq. miles in extent. The assays hitherto taken from samples collected by the state mining engineer show between one and a half to two ounces of gold to the ton. This is stated to compare most favourably with the gold in the Mysore fields. The deposit is considered to be likely to prove all the more valuable because the gold has been found in close association with copper assaying at about 6 per cent, and even if the gold deposit disappoints expectations it is held that the copper is a most important discovery.

Malted Foods in Madras.

It appears from the report of the Director of Industries, Madras, that there is good possibility for manufacturing malted foods in Madras Presidency of a standard high enough to enable it, as far as quality is concerned to compete successfully in the market. The Government, however in view of the financial position of the Presidency consider it inadvisable to assume the responsibility of undertaking the manufacture of the product on a commercial scale. The report on the results of the investigation,

it is understood, will be published for general information, and should be left to private enterprise to proceed further.

Industry in Mysore.

In reviewing the work of the Industries Department, the local Government have instructed that the hand-spinning industry in the State should be given every encouragement. It is reported that an improved type of 'charka', has been designed by the department and that about 300 of them are now in use in the State. As a subsidiary occupation among agriculturists for use fully utilising their spare time and as holding the promise of an extra income calculated to alleviate in some measure the poverty of the masses the hand-spinning industry deserves every encouragement.

It is reported that soap valued at about Rs. 60,000 was manufactured during the year and the sales effected amounted to a lakh and odd as against a lakh and a half in the previous year.

The improvement of the Weaving Factory is said to be engaging the attention of Government. No information is given in the report regarding the financial results of working of the concerns under the management of the department. A sum of Rs. 67,000 and odd is said to have been given by Government as assistance to private industries.

SCIENTIFIC AND TECHNICAL TOPICS.

The Most Distant Stars.

The greatest astronomical observatory of the world is at Mt. Wilson, which contains the largest telescope with an 100 inch reflector. One may be surprised to know that with this instrument one is able to observe objects in heaven at a distance of 8 hundred and 40 million, million, million miles (8,40,000,000,000,000,000,000). The stars of the milky way are at an average of 1,40,000,000 light years, a light year being the distance which light will travel in a year going at a speed of 1,86,000 miles per second. One light year is nearly 6,000,000,000,000 miles. A sphere of 140 million light years' radius comprises the observable region of space.

•Mystery Clock.

The latest novelty in Horology is a mysterious clock of crystal, priced at £800. The mystery lies in the fact that, though the crystal is transparent, there is no visible sign of any mechanism, and no one except the maker knows how it goes.

The hands, which are of platinum and diamonds, revolving on a thin metal pinion, are behind the face of the clock, embedded in the heart of the crystal block which is five inches in diameter. There is no apparent connexion between the hands and the framework.

The secret of the mechanism will be revealed only to the purchaser. Although rich enamel, gold, and jewels are used to decorate the framework, it is the craftsmanship that accounts for its high price.

Capacity of Normal Brain.

A normal brain possesses both the power to work and the power to rest. It has capacity not only for effort but equally for relaxation. Persistent rush and hurry ends in neurasthenia, when the brain comes to resemble a car deprived of brakes and reversing gear and with a broken steering wheel. Repose of mind departs. The machine races wastefully and exhaustion is not far distant. The mental faculties, though still vigorously active, are ineffective; orderly sequence is lost, and thought ceasing to travel on wards, whirls round and round in endless circles which do not lead to any conclusion.

It is desirable, therefore, to take stock of one's habits from time to time, and to arrange periods of rest in a rational manner. The fundamentals of animal existence demand the first place for their consideration. The remainder of the day's programme can be built around them.

Watch that Never Stops.

A certain watch-maker of Catalonia has made a watch which it is claimed will go for ever without re-winding.

It shows the seconds, minutes, hours, days, weeks, months, and years. It indicates the hour by day or night, the day of the week and of the month, leap years, signs of the zodiac, and the number of weeks remaining in the year. Also it records the time of sunrise and sunset, the phases of the moon, and numerous other things.

The watch has more than 800 parts, and was made in 1,100 hours of spare-time work.

Lacquer Shawls.

The latest development in lacquer work, quite apart from the decoration of furniture, is the adornment of shawls and gowns. On one of the fashionable evening shawls, over a groundwork of glorious flame colour, the lacquer artist has depicted a magnificent peacock whose outspread wings practically cover the whole surface. The colour scheme on the flame background is copper, old gold and primrose—the exquisite after-glow colourings of the setting sun!

Type Reading Optophone.

Optophone is a device for electrically reading printed matter through the assistance of a selenium cell. The printed matter is placed at the top of a glass plate. The rays of a small electric lamp are condensed and passed through a siren disk, which interrupts the flow of light as it revolves 30 times each second. The light is then passed through a series of concentrating lenses and is caused to illuminate that portion of the manuscript which is to be read. The light is reflected back from the printed surface and impinges upon the sensitive selenium cell, which has the

property of changing its resistance under different conditions of illumination. The selenium cell is connected in series with a high tension battery and a telephone receiver. As the paper is moved across the glass plate, and as different amounts of light are neglected by the various letters a changing musical note is heard in the telephone receiver.

It is said that a blind man can achieve a moderate facility in reading printed matter after about 8 hours of practice.

Aeroplane in Agriculture.

Dusting the plantations from low-flying aeroplanes with calcium arsenate to kill the weevil has, for some time past been carried on extensively in the southern areas of the United States by a commercial undertaking operating a score of aircraft. In the experimental work that preceded this innovation, it was soon realised that special dusting apparatus, taking advantage of the velocity of the air current generated by the propeller, and the force of the propeller's down draught, would be necessary for the efficient application of the aeroplane to this field. Equipped with such apparatus, the aeroplane not only operates at least a hundred times faster than the best ground machine procurable, but diverts none of the labour force from ordinary cultivation, is not immobilised by the muddy condition of the ground after the rains, strips none of the cotton from the plants, as happens in the case of mule-drawn machines, and forces such a finely pulverised dust upon the plants that it adheres even when the leaves are dry, thus obviating the necessity to work during the night so that dew may facilitate the application.

FORMULAS, PROCESSES & ANSWERS.

Copal Varnish.

3448. J. E., Calcutta.—Wants a recipe for copal varnish.

Fuse 8 lbs. second sorted African copal; add $2\frac{1}{2}$ gal. clarified oil. Boil slowly together for 4 or 5 hours until quite stringy; add $5\frac{1}{2}$ gal. turpentine mixed, with $\frac{1}{2}$ lb. dried copperas, $\frac{1}{2}$ lb. litharge; strain and pour off. In order to hasten drying mix with the above, while hot, 8 lbs. second sorted gum annis, $2\frac{1}{2}$ gal. clarified oil, $\frac{1}{2}$ lb. dried sugar of lead, $\frac{1}{2}$ lb. litharge, $5\frac{1}{2}$ gal. turpentine. This varnish will, if well boiled, dry hard in 4 or 6 hours. Some copal varnish takes, however, 12 hours to dry. This varnish is used in house painting for the best grained work, as it dries well and has a good gloss.

Moulds for Silver-work.

3280. R. W. C., Bombay. Asks, what are the materials used in preparing moulds for silver work?

The process of casting gold and silver is chiefly employed for such articles as rings, charms, animals, figures, and other ornaments used in the goldsmith's art.

Moulding is the term applied to the various operations connected with the preparation of the sand or other materials used for making the moulds. The materials generally used are sand, loam, marl, cuttle-fish bone, bath-brick, black-ink and pea-flour. Sand is the most

common, and, for general purposes, is the most perfect moulding material. The special qualifications are that the molten metal will not fuse or chemically change it, while better impressions are obtainable from it than from any other material.

Different kinds of castings require different kinds of sand. For some, it must be porous, yet adhesive; for others, it must be very fine and free from grit, but still adhesive enough to retain impressions of the most minute details of the pattern. The best and most suitable sand for casting gold and silver work is that obtained from red-stone quarry.

Photography on Silk.

3565 I. S., Amritsar --Wants a simple method of printing photographs on silk.

Pour 20 oz. boiling water on 100 gr. ammonium chloride and 60 gr. Iceland moss. When nearly cold, filter, and immerse the silk in it for 15 minutes. To sensitise immerse the silk in a 20 gr. solution of silver nitrate for 16 minutes. Let the nitrate bath be rather acid. When dry, prepare for printing by attaching the silk to a piece of card-board, a little smaller than itself, by turning the edges over and fastening with small pieces of gummed paper slightly over print. Wash in 2 or 3 changes of water, and tone in a gold bath made thus—29 oz. water, 2 dr. soda acetate, 4 gr. gold chloride and a

few gr. common whiting. Filter and keep for 24 hours before using. Let the prints be toned slightly bluer than they are required to be when finished. Rinse them in water, and fix in a solution of hypo, 4 oz. to the pint of water; 20 minutes is ample time for fixing. Wash well.

Cheap Washing Soap.

3538 T. K. B., Barisal.—Wants a formula of cheap washing soap.

A cheap quality of washing soap may be made from oil extracted from "til" and "sarson" seeds. If desired animal fat may be used.

One maund and 20 seers of sappi (carbonate of soda) are mixed with about 20 seers of lime, and a small quantity of water is added to the mixture, until it becomes of the consistence of paste or dough. A solution is then made by adding water to the mixture and filtering several times and each time pouring the filtrate over the undissolved residue. The solution is then added gradually to 4 maunds of oil and the whole well stirred. After standing for some time the solution is boiled, the superfluous oil rises to the surface and is skimmed off, the soap becomes insoluble; and when in a half melted state, is drawn off into moulds, and on cooling is ready for use.

Dried Plantain.

3549. K. B. R., Madras. Enquires how bananas are dried.

There are three distinct ways in which the ripe banana may be dried. First, exposing the fruit to an atmosphere of sulphuric acid gas before the desicca-

tion is begun. Second, boiling rapidly very ripe fruit in water which contains sulphate of lime. Third, by boiling it in syrup. By either of these, the albumen and casein of the fruit coagulates, and the tendency of the banana to decay and ferment is stopped at a period favourable for desiccation. Experience shows that the second method is the best to employ; in moist climates without this precaution the fruit, instead of drying, becomes damp. To expose the fruit to the sun's rays after boiling, tray of bamboo, or of anything which permits the free action of the air and light on the fruit may be used. If rain falls, they are dried in a furnace, which must be left open otherwise the bananas bake instead of drying. The heat also must be moderate. The bananas, when dry, are pressed and packed in boxes. The fruit thus prepared is a very good article of food resembling figs and its abundance and easy preparation would render it a cheap one.

Finishing Linen Towels.

2956 H. L. H., Calcutta.—Wants to know the process of finishing linen towels.

Linen towels may be finished either upon a heavy hydraulic mangle or upon a butting engine. Such towels may be made out of all-linen yarns which have been three-quarter bleached before weaving.

In a hydraulic mangle the goods are run through the mangle under heavy pressure. It is not necessary to use a softening or finishing oil to get a fine lustrous finish. To get the gloss it is a question of running the goods through

the mangle a sufficient number of times with the proper amount of water in them. A high gloss is natural to linen when bleached and properly finished and neither need as oftener be used for a better finish. The cloth is passed through a weak sizing solution, say about $\frac{1}{2}$ lb. of starch to 1 gallon of water, with about 10 lbs. of Epsom salts to 5 gallons of solution, then boiling up. After passing through this the cloth is dried. The goods are then run through a damper or conditioning machine and got to a nice percentage of moisture; then run on the beam of the beetles and given about forty-five minutes to one hour, then changed and given another forty-five minutes. The treatment softens the goods up and emphasizes the linen appearance.

The nearest approach to a beetle finish is a chased finish off the calendar. Thousands of yards are given the chased finish and sold for beetle finish. It is obtained on a calendar by passing the cloth through all the nips, taking it over rollers behind the machine and then passing it through the machine again. The pressure of the calendar rollers upon the bowls or their layers of cloth presses the yarns of one layer into the yarns of the layer underneath, thus giving a thready appearance. This process may require a softener in the sizing solution as it has a tendency to harden. For such a solution soluble oil, cocoa oil, or glycerine substitute may be used.

A Simple Electric Cell.

3288. M. L., Tanjore.—Writes, please describe in brief a simple electric cell.

Daniel's cell is an instance of a simple electric cell. This consists of a rod of amalgamated zinc immersed in either dilute sulphuric acid (eight of water to one part acid), or a dilute solution of zinc sulphate contained in a pot of unglazed and porous porcelain. This pot stands in an outer vessel of glazed earthenware containing a saturated solution of copper sulphate which should contain a little free sulphuric acid, and is often provided with a shelf partially immersed in the liquid, upon which crystals of copper sulphate may be placed, so that the strength of the copper sulphate solution may be preserved in spite of the constant removal of copper from it, due to the action of the cell. A sheet of metallic copper is bent round the porous pot, and stands immersed in the copper sulphate solution. The cell terminal screws are attached to the zinc and copper plates respectively, the zinc being the negative pole. When the cell is not in use for some time the porous pot should be lifted out. The level of the zinc sulphate solution or sulphuric acid solution, according to which is employed, should be kept an inch or so above the level of the copper sulphate solution. This cell gives a remarkable constant electromotive force and therefore a very constant current. It does not polarise. The zinc sulphate solution gradually gets stronger and must from time to time be diluted by removing some of the liquid, and filling up with water, or dilute sulphuric acid. The copper sulphate solution gets weaker in copper and its strength must be kept up by adding fresh crystals of copper sulphate, either placed on the shelf described above, or by

suspending a muslin bag containing crystals immersed in the solution near the top.

To Make Crayons.

2945. P. S., Hoshiarpur.—Asks, How to make crayons.

Take three quarters of a pound of blue clay, three quarters of a pound of the colouring required, such as vermilion, chrome, prussian blue, orpiments, etc.; 2 ounces of turpentine, 4 ounces of spirits of wine, and 6 ounces of fine shellac. The clay must be well mixed with water, passed through a fine lawn sieve, and allowed to subside; the water is then poured off and the clay dried. The shellac must be dissolved in the mixed turpentine and spirits with a little warmth. The dry clay and the colouring, must be blended in a mortar, and then the shellac mixture added and well incorporated till the whole is a doughy mass; it is then to be rolled out into a pencil form and dried with stove heat. To make the crayons of uniform substance, the paste may be placed in a cylinder, with a hole at one end and a piston at the other; the "wormy" pieces that pass through are then cut into proper lengths and dried.

Water for Bleaching & Dyeing.

3365. G. S., Scistan.—Writes, How to treat water to make it suitable for dye-bath?

In filtering water for dye-houses and bleacheries it is probably more efficient to use closed mechanical pressure filters rather than the open type of gravity filter. Both use sand as the filtering

medium, but the pressure filter is more easily regulated and adjusted to the needs at hand; also it occupies much less space and, if of the proper type, is very readily cleaned by simply reversing the flow of water for a short time.

Another form of water treatment for the purpose of obtaining a very soft water is known as the "Permutit" process. This process is only for the softening of the water and presupposes a filtering at first through a suitable sand filter for the purpose of removing suspended and organic matters. In the Permutit process a form of pressure filter is used employing an artificial zeolite as the filtering mechanism. This mineral has the peculiar property of exchanging its sodium content for calcium or magnesium when brought into contact with water containing compounds of these latter metals. Thus a hard water containing calcium sulphate when filtered through a layer of this zeolite gives up its calcium to the zeolite and receives in exchange a corresponding quantity of sodium, so that in place of calcium sulphate the water will come from the filter containing an equivalent amount of sodium sulphate. By this process water of zero hardness may readily be obtained. The zeolite filtering medium is regenerated by passing through it a solution of common salt, which takes out the lime and replaces it with sodium again.

Lustring Silk.

3404. K. N. R. A., Salem.—Writes, How to ensure lustre of silk in dyeing?

What is known as "lustring" is a modified form of stretching performed in a machine. Besides slightly stretching the fibre, it greatly improves the lustre of the silk. The friction of the hanks against the polished metal rollers of the machine makes the fibres broader and flatter, an undesired effect which is counteracted by a short steaming, at ordinary pressure, in steaming boxes, whereby the normal roundness of the fibre is restored.

The hanks are then dried, and as silk is extremely susceptible to dry heat, and heat has an unfavourable influence on the surface tension, on which the lustre of the silk depends, high temperatures in the drying process must, as far as possible, be prevented. The best method is to dry the silk with dry, unheated air; and if drying chambers or stoves are used, the temperature should not be allowed to rise above 35°C. Moving the hanks about on the drying rods facilitates the operation.

Washing Powder.

3536. A. N. L., Nainital.—Writes, Can you suggest any preparation that will save labour in washing cloth?

A common type of washing powder is made by allowing soda crystals to melt in their own water of crystallisation, often with the addition of a small quantity of water to compensate for that which escape during the process. Some palm oil, ground yellow resin, or ordinary soap, is incorporated with the mixture, and the whole is then poured out into large, shallow trays of sheet iron, in which it is diligently stirred dur-

ing cooling, so that it solidifies not into crystals or coherent masses, but into a rough powder, having the appearance of coarse sugar. The supposed advantage of these preparations is that they dissolve more readily than soap and soda crystals. Some varieties are coloured with a little turmeric, and others with artificial ultramarine.

Preserving Meat with Vinegar.

3496. P. K. R., Calcutta.—Desires to know the process of preserving meat with vinegar.

Vinegar is an excellent preservative of meat, especially in hot summer weather. In the tropics meat is frequently put into a clean linen cloth which is thoroughly soaked with vinegar, some salt also being sprinkled on the cloth. Meat kept for a few days in this manner is very tender and readily digested. It is very probable that vinegar might be advantageously employed on the large scale for the preservation of meat, together with complete exclusion of air. In order to prevent the vinegar extracting the juices of the meat the latter should be exposed to the action of the vapours of strong vinegar.

Synthetic Chemicals in Perfumery.

2514 K. C. N., Bannu.—Wants to know the application of synthetic chemicals in perfumery.

Natural floral perfumes are in many cases strengthened and cheapened by judicious additions of synthetic perfumes. Many floral and bouquet perfumes are compounded from combinations of essential oils, floral extracts, animal and

balsam, tinctures and synthetic products the following being typical recipes.

I AMBER BOUQUET.

(A) Essence of musk	10
Vanillin	1
Essence of ambergris	40
Benzyl Acetate	2
Otto of rose	1
Tinct. of benzoin	2
Tinct. of Styrax	2

(B) Patchouli Oil

Geraniol

II. VIOLET.

(A) Ionone (100 per cent)	10
Oil of orris	20
Triple extract of Violet	30
Otto of rose	1
Triple extract of Jasmine	5

(B) Linalyl acetate,

Triple extracts of cassie and jonquil, Tinct. of Musk, Ylang ylang oil, Vanillin

The following are purely synthetic recipes.

III. JASMINE.

(A) Benzyl acetate	10
Indol	1
Linalol	1
Methyl-anthranilate	1

(B) Nerolin, Ionone, Linalyl acetate, Geraniol, Citronellol

IV. ROSE.

(A) Geraniol	5
Citronellol	3
Benzyl acetate	1
Cinnamic alcohol	1

(B) Esters of geraniol and citronellol, phényl ethyl alcohol

A rather thick starch paste is prepared by first beating up a handful of raw starch, usually corn starch, and tea-spoonful of fine rice flour with about 1 qt. of water, making a liquid of cream like consistency. A certain quantity is poured into a quantity of boiling water while the latter is violently stirred with a short wooden spatula. With this the portions of the linen to be dressed are well smeared, the linen moist from wringing, and the starch quite hot. Thus smeared, the pieces are laid aside for a few minutes, then rubbed well between the hands, so that the paste is well distributed in the fabric. The linen is then usually dried by artificial heat. When ready for ironing, the starched portions are dampened by means of a cloth dipped in raw starch water. In ironing, the irons are first made very hot, and cooled somewhat, externally, just before using by momentarily plunging them into a part of water.

The ordinary laundry starch may be improved upon by the following method. To each bowl of starch add 1 tea-spoonful of Epsom salts and dissolve in the usual way by boiling. Articles starched with this will be stiffer, and will be rendered, to a certain degree, fire-proof. To use corn starch, boil to a smooth paste, cool, and starch the goods; dry quickly. Before ironing, dampen down in thin, raw starch water. A little gum arabic or pure white wax is often added to the boiled starch to afford a fine gloss. Iron in the usual way, with a common sad-iron; then dampen slightly with a clean cloth and the starch water, and polish briskly with a polishing iron.

Starching Collars & Cuffs.

3443. S. N. M., Faridpur.--Requires hints in stiffening and polishing collars and cuffs at home.

BRIEF QUERIES AND REPLIES.

[Questions of any kind within the scope of **Industry** are invited. Enquiries or replies from our experts will be published free of charge. Questions are not generally replied by post.]

3349 M. J. S., Madras—Process of preserving mangoes appeared in November 1926 issue of **Industry** under the caption of Preserving Fruits by Refrigeration. For further particulars write to the Agricultural Advisor to the Government of India, Pusa.

3350 K. S. N., Madras—An article on snake-bite cure appeared in August 1926 issue. The process of manufacturing saccharine will be found in September 1926 issue. Liquids are measured in gallons and not in lbs. Recipes of hair dye will be found in January 1925 issue. For recipes of patent medicines consult a physician.

3351 V. S., N. C., Tapeswaram—For opticals enquire of S. K. Dey & Sons, 124, Shova Bazar Street and P. S. Dutt & Bros., 8 Ezra Street, both of Calcutta.

3354 J. N. B., Sialkot—For lamp black enquire of Jangra Commercial Agency, Pirana Bazar, Ludhiana.

3355 S. B. A., Bareilly—Cane may be supplied by P. C. Coomar & Nephew, 71-E, Clive Street and Malayan Cane & Timber Co., 10 Sukka's Lane, Kamari House; both of Calcutta.

3356 K. M. B., Kapadwanj—For a complete list of the members of the Royal Calcutta Turf Club write to the Secretary at 13 Russel Street, Calcutta. For books write to Mc Caskey Register Co., Alliance, Ohio, Mc Millan Book Co., Syracuse, New York and Reynolds & Reynolds Co., Dayton, Ohio; all of U. S. A.

3357 S. N. S., Mahabaleshwar—For patent registration write to P. Lodge & Co., Post Box 6772, Calcutta; Norris & Co., Post Box No. 337, Calcutta and Alum & Co., 93/5, Collin Street, Calcutta.

3358 I. G. T. C., Cocanada—For toys of various kinds enquire of K. G. Maniar, 55/1, Caning Street, Calcutta; The Union Trading

Co., 109 Harrison Road, Calcutta; Mahomedbhoy Jvabhoy & Co., Nizam Street, Bombay and Ahmedali Gulamali Adat, Kareim Mistry Bldg., Sandhurst Road, Near Dongri Bazar, Bombay. For rubber toys enquire of K. B. Nan, 233 Old China Bazar Street and Pioneer Toy Mart, 234, Old China Bazar Street, both of Calcutta.

3359 D. S., Rajahmundry—History of Indian (Hindu) Chemistry by Su P. C. Roy may be bought of Chackraverty Chatterjee & Co. Ltd., 15 College Square, Calcutta.

3360 S. R. N., Masulipatam—It is advisable for you to have the tools prepared by the local blacksmiths as per order. You may in the meantime write to N. G. Mitra, Chandney Chowk, Calcutta, for tools.

3361 M. M. Giridih—For diagram and working principle of the machine referred by you consult a mechanical engineer specially expert in dairy machineries.

3363 D. E., Galle—For glass bottles enquire of S. K. Dey & Co., 124 Shova Bazar Street and Calcutta Glass & Silicate Works, Belgatchia, Sham Bazar, both of Calcutta. For fancy labels enquire of Calcutta Fine Art Cottage, 76 Dharamtolla Street, Calcutta. Cardboard boxes may be supplied by H. L. Sett & Sons, 8 Nilmoney Mitter Street, Calcutta and Bengal Cardboard Box Manufacturing Co., 64/1, Machua Bazar Street, both of Calcutta. For die stamp enquire of Rae & Co., 6/A, Madge Road, Calcutta and R. P. Ganguli & Co., 8, 9, 10 & 11 Mati Seal Street; both of Calcutta.

3366 G. M. G., Fagu—For selling manjit dhatura you may correspond with S. N. Dey, M.Sc., Post Box No. 7851, Calcutta.

3368 K. C. P., Sibsagar—Vide No. 2698 in January 1927 issue of **Industry**. Your letter has already been redirected to the party

3369 A. M., Madras—Wants to be put in touch with dealers in tobacco leaves of various kinds, viz., Hinglee, Mothari, Pulo and Tamak

3370 D. D., Dacca—Thank you for your good suggestion. Articles on small industries appear regularly in the columns of **Industry**. Articles on salesmanship appear in the columns of **Commercial India**.

3371 H. P., Pahtana—Sand for glass manufacture is available in U. P. It is not possible to manufacture edible colour on a small scale. Vaseline is a natural product.

3372 M. A. V., Madras—For selling betels and betel nuts advertise in the pages of **Industry**.

3374 N. V. N., Bhamo—A formula of cheap laundry soap appeared in January 1926 issue. Process of gold and silver plating appeared in the last issue. Pipe tobacco are made by cutting and flavouring smoking tobacco. Process of flavouring appeared in August 1926 issue. For machinery required enquire of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

3375 V. N. L., Shikarpur—Review of a single formula is not published in the columns of our magazine.

3376 S. B. S., Rewa State—Wants to be put in touch with dealers in salt and tobacco.

3377 M. S. S. S., Madura—Sulphuric acid may be had of Beneal Chemical & Pharmaceutical Works, 15 College Square, Calcutta, D. Walde & Co., 1 British Indian Street, Cal-

cutta; E. W. Berk & Co. Ltd., 1 Fenchurch Avenue, London, E. C. 3 and West Ham Chemical Works Ltd., 8 King William Street, London, E. C. 4. Gunny Cloth may be supplied by M. M. Bhagat & Co., 72 Canning Street, Bham & Co., 6 Pollock Street and S. C. Chunder, 5 Clive Ghat Street, all of Calcutta.

3378 D. R. K. C., Colombo—Tin boxes may be had of Gajanand Ram Pratap, 6 Halsi Bagan Road, Calcutta. For tin box making machineries write to Taylor & Challen, Birmingham, England. Tin plates may be had of Balmer Lawrie & Co., 103 Clive Street, Calcutta.

3379 R. V. N., Perambur—Til oil is sesame or gingelly oil. It may be bought of Anath Nath De, 3 Moidáputty, Bara Bazar, Calcutta. For han oil manufacture you may go through the booklet Han Oil Manufacture published from this office.

3380 H. S. A., Kulladakurichi—Beads may be bought of Anni Chand Mehra & Sons, 34 Armenian Street, Calcutta. Diamonds may be had of Thakorlal Hiralal & Co., Mercantile Bldgs., Lall Bazar Street, Calcutta. Weighing balance may be had of B. K. Paul & Co., 1-3, Bonfields Lane, Calcutta.

3382 Z. F. W., Lahore—The following are some of the rice mills: Annapurna Rice Mill, Tallygunge, Bharat Laxmi Rice Mill, 85, Chetla Road, Chetla, Hope Rice Mill, Tallygunge, Jogendra Rice Mill, Shahpur, Tallygunge and Krishna Rice Mill, Italgata, Tallygunge, all of Calcutta.

3383 T. P., Madras—For the formula referred to by you write direct to the Editor of the paper. If you state definitely article for which you require a recipe we shall try to help you.

3385 A. H., Kekri—As you are interested in dyeing it will be advisable for you to go through the August and September 1925 issues of **Industry** that contain a large number of dyeing recipes. For books on dyeing you may write to Chakraverty Chatterjee & Co. Ltd., 15, College Square and Book Co., 44A, College Square, both of Calcutta. Colours may be had of Aminchand Mehra & Sons, 34, Armenian



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31D, Chowringhee, Calcutta.**

Street and Hansraj Vishram, 13, David Joseph Lane; both of Calcutta. Chemicals used in dyeing may be bought of Calcutta Chemical Co., Ltd, 35/1, Panditia Road, Ballygunge, Calcutta.

3386 R S, Hayangudi—For hand power oil-extracting machine write to Indo-German Trading Co., 24, Strand Road, Calcutta.

3387 T D C, Madras—Glass bottles may be supplied by S K Dey & Sons, 124, Shova Bazar Street and Calcutta Glass & Silicate Works, Belgachia, Shambazar, both of Calcutta. Card-board boxes may be had of H L Sett & Sons, 8, Nilmoney Mitter Street, Calcutta.

3388 S I, Masulipatam—Beads may be supplied by Annchand Mehra & Sons, 34, Armenian Street and D M Isaque, 125, North Range, New Market, both of Calcutta. Imitation stones may be supplied by Hiralal Nandlal Kshetty 38, Mugapaty, Barabazar, Calcutta. Glass bottles may be supplied by S K Dey, 124, Shova Bazar Street and P S Dutt & Bros., 8, Ezra Street, both of Calcutta.

3390 J M P F, Parlakumedi—Packing boxes may be had of Packing Case & Timber Co., 31, Lynton Street, Entally, Calcutta. If the glass is not properly tempered it cannot withstand extreme cold or heat.

3391 C F S, Porbandar—The stiffness of the soap manufactured is due to excess of alkalis. Try with proportionate quantity of alkalis and fat.

3392 T H A T S, Trichinopoly—Leather and leather goods may be supplied by W S Dossen & Co., Post Box No 7864, Calcutta, Sircar Bros, 66, Russa Road, Calcutta, Calcutta Industrial Leather Works, 1, Pollock Street, Calcutta, H S Abdul Gummy, 23, Colootola Street, Calcutta, Ibrahim Lalji, Mantola, Agra, Kashtadas Ahmed Hassan, Hiranman-Kapurwa, Cawnpore and M Zahir & Co, Colonelganj Road, Cawnpore.

3393 M M B, Bombay—No other easy method is known at present.

3394 A R K S, Chanda—A formula of liquid depilatory will appear in an early issue.

3395 A T C, Bezwada—Process of flavouring tobacco appeared in August 1926

issue. You should procure the show cases locally.

3396 S S R, Hindupur—Cycles may be supplied by German Louis G m b H, Felderstrasse 27, Leipzig, Germany, Act Ges Vorn Seidell & Naumann, Hamburger Strasse 19, Dresden, Germany and Act Ges Vorn Frister & Rossamann S O Skaltzerstrasse 134, Berlin, Germany. Sewing machines may be supplied by Max Dietze G m b H, Dresden 19, and Berndt & Brune, S 69, Kottbuser Damm, Berlin; both of Germany.

3397 H H, Bishanpura—Cycles may be had of Dutt Das & Co, Mercantile Bldg, Lall Bazar, Calcutta, Standard Cycle & Motor Co., 43/11, Dharmatola Street, Calcutta, Malik Bros, 10, Bentinck Street, Calcutta, S N Bhattacharjee, 5, Dharamtala Street, Calcutta, Graduate Cycle & Motor Agency, Mori Gate Delhi, Imperial Motor & Cycle Co, Kashmere Gate, Delhi; Bombay Cycle & Motor Agency Ltd, 16, New Queens Road, Bombay and Wellington Cycle & Motor Co, 313, Hornby Road, Fort, Bombay.

3398 R S J, Delhi—Add a little quantity of gum arabic to the powder before putting in the machine.

3399 S C, Madras—Electrical goods may be supplied by Franz R Courad, Glogaverstrasse, 19-21, Berlin S O 36, Germany, American National Commercial Co, 79, W Monroe Street, Chicago, U S A and Ward & Goldstone Ltd, Fredrick Road, Pendleton, Manchester.

Kaminia Oil

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Finest dressing for the Hair Delicately perfumed. Re. 1/- per bot charges extra.

OTTO DILBAHAR (Regd.)

Concentrated perfume of Mogara and Jasmin flowers. Lasting delicate odour reminding a garden of flowers. Bot. of ½ ounce Rs 2/-, 1 ounce Re 1/4/-, V. P. & Packing extra.

Above products has the largest demand everywhere. Widely advertised. Write to-day for samples free.

ANGLO INDIAN DRUG & CH. CO.,

P.O. Box 2062, Juma Masjid, Bombay.

3401 S V K R, Proddatur—Advertisement films are chiefly meant for circularising advertisement through cinema film. For securing advertisement you should engage canvassers and agents who would work for you either on commission basis or on monthly pay. For cameras and other equipments necessary write to The Photographic Stores & Agency Co., 154, Dharamtala Street, Calcutta. Process of preparing vanishing colours is the only article contributed by Mr. K C Joshi in September 1926 issue of **Industry**.

3402 J D, Lyallpur—Picture postcards may be supplied by Tuck Raphael & Sons Ltd, Raphael House, Moorsfield, London E C 2; City Post Card Co., 42, Mansell Street, London E 1; P. Racine & Cie, Bank Sebastopol 90, Paris, France and Photo-chemie G m b H, N Stolpischestrass 37, Berlin, Germany.

3403 K C, Amritsar—Magical appliances may be supplied by The Magical Co., Jhansi; Magic House, Nagpur, R O Verma, Mohindru, Patna; J S Oghvie & Co., 57, Rose Street, New York, U S A, and Mill Gladstone Ltd, 14, Green Street, London W C 2.

3407 N P, Gwalior—Wants to know the address of the agent of Turkish Bath Soap manufactured by Colgate & Co., of New York.

3409 B L S, Babu Mandi.—You may start wick-making industry as Swadeshi wick has fairly good demand in the market. Try to manufacture really good articles that will resemble foreign makes in quality, finish, etc. Wick-making machines may be had of Oriental

Machinery Supply Agency Ltd., 20/1, Lall Bazar Street, Calcutta.

3410 H. M. S., Patiala.—Try to be an apprentice in The Gramophone Co., Ltd., Post Box No. 48, Calcutta. Manufacture of gramophone records involves high technicalities so it cannot be treated in this magazine.

3411. H S B, Karachi—Your queries are unintelligible. Be more explicit.

3412 U D S, Raghunathpur—A good formula of washing soap with coconut oil appeared in January 1926 issue.

3413 P V S, Ongole—If you go through the last two or three volumes of **Industry** you will find all the recipes you require.

3414 D. T. A., Gauhati.—You may send your son to Bengal Technical Institute, Jadavpur near Calcutta for learning mechanical or electrical engineering. Advertise widely for selling the raw materials you deal in.

3416 M F H, Marwar—You may wash your clothes with washing soap formula of which appeared in January 1926 issue.

3417 K S V, Madras—For Swadeshi stationery goods enquire of Dass & Co., 60, Sikdar Bagan Street and Bengal Miscellany Ltd, 99, Manicktala Main Road; both of Calcutta. Swadeshi Cloths may be supplied by East Bengal Society, 1, Mirzapur Street; Judhishur Daw & Lahit MoFon Daw, 211, Bow Bazar Street and Krishna Lal Manila, 207/2, Harrison Road, all of Calcutta. Papers of all kinds may be had of Ghosh Bros, 63J, Radha Bazar Street, Calcutta. Glasswares may be bought of Calcutta Glass & Silicate Works, Belgachia, Shambazar and Bengal Glass Works, 39/1, Canning Street, both of Calcutta. Enamel wares may be supplied by Bengal Enamel Works Ltd, 55, Canning Street, Bengal Enamel & Stamping Works, 9, Middle Road, Entally and Pioneer Enamel & Iron Works, 82, Colootola Street, all of Calcutta. Tooth paste may be had of Bengal Chemical & Pharmaceutical Works Ltd., 15, College Square Calcutta. Soaps of all sorts may be bought of Calcutta Soap Works, 15, College Square, Calcutta. For brushes enquire of Brushwares Ltd., 123/1, Halsey Road, Cawnpore and Cal-

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321, Hornby Road, Fort, Bombay.

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Calcutta—84A, Clive St.,

Post Box No. 675.

Karachi—Bunder Road,

Post Box No. 230.

Madras—Post Box No. 1260.

Note.—All kinds of Myers Pumps as shown in the block can be had of us at moderate prices.



cutta Brush & Fibre Co., 172, Bow Bazar Street, Calcutta. Swadeshi Combs may be had of Jessore Comb Factory, 201, Lall Bazar Street, Calcutta. For Report of the Cottage Industries of Bengal write to the Director of Industries, Bengal, 40/A, Free School, Street, Calcutta.

3418. A. K., Rewari.—Process of preparing natural colours appeared in July 1925 issue of **Industry**.

3419 S. K. B., Comilla.—Before preparing tablets add some gum arabic with ink powder and put in the machine

3420 S. K. M., Bombay—Indian stamps cannot be used in foreign countries. Read books on letter-writing and practise writing letters, according to the instructions given in the book. As regards export business you should apply the same principle. Write letters to the advertisers under care of **Industry** when your letters will be duly redirected. T T or Telegraphic Transfer is a daily rate quoted in the money market for transferring money by cable from one country to another. For example if a person in Bombay wishes to pay a certain number of sterling pounds to a house in London on any particular date he may pay into a bank the equivalent sum of Indian money calculated at the transfer rate of the day when the bank would cable out to their London Office to pay the nominee the sum required. O. D. or On Demand is a term used on bills of exchange when they are payable on presentation. Such bills do not require accepting. There is perhaps no decoding office in Bombay. Used postage stamps have no value generally but occasionally some rare stamps fetch good price. Four Bombay maunds equal to 1 Cwt. One Calcutta maund equals 82 lbs. For second-hand books and directories try to secure locally. For starting news-agency business despatch circulars to advertisers of various newspapers offering your service and rates of advertisement.

3424. A. M. S., Cawnpore.—For learning dentistry write to the Manager American Dental Institute & Clinic, Karachi and The Calcutta Dental College & Hospital, 261, Bow-bazar Street, Calcutta. For ultra-violet ray

apparatus write to L. G. Vimar, 5, Dalhousie Square, Calcutta.

3427. M. L., Padur.—For preparing Bengal sweets you may go through Bengal Sweets by Mrs. J. Halder to be had of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta. A recipe of tooth powder will be found in October 1925 issue. Process of preserving potatoes appeared in April 1925 issue

3428 B. S. S., Bijapur—For cardboard boxes and labels enquire of Calcutta Fine Art Cottage, 70, Dharamtala Street, Calcutta. Glass bottles may be had of S. K. Dey, 124, Shova Bazar Street, Calcutta. Essences may be supplied by Paradise Perfumery House, 73, Colootola Street and Sikri & Co., Post Box No 2287, both of Calcutta

3431 B. P. C., Amritsar—We have no such books. You may however enquire of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta, for the books you require

3432 M. L. S., Agra—You may correspond with Manager, Kelly's Directory Ltd., 182/184, High Holborn, London W. C. 1, for inserting your name in the Directory.

3434 R. P. D., Calcutta—You may refer your query to J. F. Madan & Co., 5, Dharamtala Street, Calcutta for necessary information regarding cinematograph.

3435 N. V. R., Bezwada—Chalk crayons are imported by Indian School Supply Depot, 290, Bow Bazar Street, Calcutta. Advertise in the Sale and Exchange pages of **Industry** for securing agents.

3436 N. R. C. L., Muktsar—Cloths are imported by Beharilal Lachmi Naram, 158, Cross Street, Calcutta, Hazarimall Sardarmull,

HOMOEOPATHY

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42, Strand Road, Calcutta.

78, Clive Street, Calcutta, Hornusji & Sons, 123, Dhobitalo, Girgaum Road, Bombay and P M Mehta & Co, 59, Church Gate Street, Bombay. Matches are imported by A H Creet & Co, 82, Hastings Street, F P Nalladaroo & Co, 55/1, Canning Street; and H Rashid & Co, 15, Zakariah Street, all of Calcutta.

3437 U N B, Lucknow—Cardboard box making machines may be supplied by John Dickinson & Co, Mercantile Bldg, Lall Bazar, Calcutta.

3438 S N G, Lahore—For buying cycles and auto wheels on hire-purchase system write to Dutt Das & Co, Mercantile Bldgs, Lall Bazar, Calcutta; M L Shaw, 51, Dharamtala Street, Calcutta. Malik Bros, 10, Bentinck Street, Calcutta and Wellington Cycle & Motor Co, 313, Hornby Road, Fort Bombay. Oil engines may be had of Healy & Gresham Ltd, 6, Waterloo Street, Calcutta. There is no institution known to us where law is taught by correspondence. There is no police magazine known to us.

3439 U N K, Calcutta—For fibre extracting machine write to Ernst Lehmann & Co, Manchester, England.

3440 S N P, Poona—Health and Strength is published from 54/55, Fetter Lane, London E C 4.

3442 L H, Shikarpur—Your query is unintelligible.

3444 N L D, Dacca—For correspondence course in Insurance enquire of The Bennett College, Sheffield, England. You may learn something about the organisation of Insurance companies if you read The Indian Insurance Journal, 97, Clive St., Calcutta. Books on Journalism may be had of Chakraverty Chatterjee & Co, Ltd, 15, College Sq, Calcutta. No magazine worth the name can be conducted

without editorials and news matter. Rules and regulations for starting joint-stock Companies were described in the fifth volume of **Commercial India**. For particulars regarding training of sanitary inspectors apply to Director of Public Health, Bengal Secretariat, Calcutta. For full list of post-box holders write to the Post-master General, G P O, Calcutta. No book showing openings for ladies is known.

3449 D K N, Yeotmal—Kelly's World Directory is to be had of Kelly's Directory Ltd, 182/184, High Holborn, London W C.

3450 J P, Delhi—Pin-making on a small scale will not be commercially profitable.

3451 P N D G, Ramnagar—Ovens and other equipments for making bread such as flour-kneading apparatus, etc, may be had of T F Thomson & Co, 9, Esplanade East, Calcutta. The above firm will supply you with costs and estimates and other necessary information.

3452 P A B, Colombo—For Indian Directory write to Thacker Spink & Co, 3, Esplanade East, Calcutta. You may use The Singapore & Straits Directory published by Robinson & Co, Singapore.

3453 A S, Secunderabad—Sporting requisites may be supplied by Continental Sports Co, 20, Chowringhee, Calcutta. Mohuntosh Bros, 15, College Square, Calcutta, G B Biri & Sons, Sialkot City and Carr Mahalanobis, 3 D, Chowringhee, Calcutta. Recipe of foaming gum appears in January 1927 issue.

3454 S K N, Mannaigudi—Balloons may be bought of K A E Sadka, 7, Colootola Street and Ali Mohamed Akber Mohamed, 22/1, Lower Chitpore Road, both of Calcutta. Wants to buy a hydrogen gas generator.

3457 T. K. S., Baroda—A recipe of Pharaoh's egg will be found in the last issue. For lactate of potash enquire of P Mukherjee & Co, 29/32, College Street Market, Calcutta.

3459 M A S, Cuddapah—Your query being in the nature of an advertisement should not be published in these columns.

3460. A. K. B., Patory—Vide No. 3459.

3463 P V R, Narasipatam—Thank you for your valuable suggestion.

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POST JUNNAR, (POONA.)

3464 Fauba Stores, Tarkula, Via Sekondi, Gold Coast—For cost of living in Calcutta write to Savoy Hotel, Bentinck Street, Calcutta. Your other queries are not in our line.

3469 B C Azangarh—For boots and shoes enquire of W S Dossen & Co, Post Box No 7864, Ray & Roy I, Cornwallis Street, Sircar Bros, 66, Russa Road North; and National Tannery, Martin & Co, Clive Street, all of Calcutta.

3470 H M D, Balasore—For cotton seeds write to the Director of Agriculture of your province. For books on railway freights enquire of Superintendent of Printing, Government of India, Central Book Depot, 8, Hastings Street, Calcutta. Wants addresses of second-hand dealers in corrugated iron sheets, joists, teas, angles, etc.

3471 C R D, Noakhali—For preparing blue-black ink powder you may consult Manufacture of Ink published from this office. Use thermometers for measuring heat.

3473 J P S, Palamau—Your query being in the nature of an advertisement should not be published in these columns. You better put an advertisement in the Sale & Exchange pages of **Industry**.

3474 S R, Jullundhur City—Recipes of marking ink will be found in September 1923 issue. An article on boot polish appeared in June 1923 issue.

3476 S C I, Budann—Process of gold-plating appeared in the last issue.

3478 S H M R, Rajganpur—To communicate with any querist write him with number and initials under care of **Industry** when your letters will be duly redirected.

3479 L R, Muzaffarnagar—Oil cloths may be bought of Standard Oil Cloth Co, 201, Rajas Deory, Dacca, Mermaid Waterproof Works, 162, Lower Chitpur Road, Calcutta and Bengal Waterproof Works, Ballygunge, Calcutta.

3480 P B, Ambala City—No such journal is known to us.

3481 L K R V, Mandi—Hardwares may be supplied by Empire Hardware & Metal Mart, Bunder Road, S Yusafali & Co, Bunder Road,

and Chainrai & Co, 78, Bunder Road; all of Karachi.

3482 S P, Kandy—For industrial and technical books enquire of Chakraverty Chatterjee & Co, Ltd, 1, College Square; Thacker, Spink & Co, 3, Esplanade East and The Book Co, 44A, College Square; all of Calcutta.

3483 A B A, Murtizapur—Dentistry may be learnt at Dental Institute & Clinic, Karachi and Calcutta Dental College & Hospital, 261, Bowbazar Street, Calcutta.

3484 D B C, Calcutta—Your query being in the nature of an advertisement should not be published in these columns.

3485 G N C, Madras—You may consult Calcutta Municipal Gazette published by Corporation of Calcutta, Corporation Street, Calcutta. Marble stones may be had of C Anas, 40, Radha Bazar Street, Calcutta and Agra Marble Works, Agra.

3486 S K J C, Madras—Electrical novelties may be supplied by American National Commercial Co, 79, Monroe Street, Chicago, U S A, Ward & Gladstone Ltd, Frederick Road, Pentleton, Manchester and Franz R Conrad, Clogauer Strasse 19/21, Berlin S O 36, Germany. For tin printing write to Saxon Chatterton & Co, Hoemth Works, Whites Ground, Bermondsey, London S E 1. For calendar printing write to Beck & Inchbold Ltd, 2, Central Bldgs, Westminster, London S W 1. Glass bottles may be supplied by United Glass Bottle Mfg Ltd, 40/43, Norfolk Strand, London W C 2. Corks may be supplied by C Bosacone Cassa Lila Selva, Gerona, Spain and Manufactures de Corcho, S A Palatugulland Palamos, Cataluna 6, Magnet Palat, Baltimore 3 ad 11, Palamos, Spain. Other addresses you require will be found in **Commercial India** the sister journal to **Industry**.

3487 M T G, Sprat—Recipes of photo-developer will be found in October 1926 issue. Yes, you may put an advertisement in the Sale & Exchange pages of **Industry**.

3488 A S C, Jullundur—The following are the addresses you require—(1) Lipton Ltd, Weston St, (2) Brooke Bond & Co, 2,

Metcalfe St., (3) Cuticura Soap Co., 21, Old Court House St., (4) Patent Medicines—B K Paul & Co., Bonfields Lane; all of Calcutta. Wants to know the sole agent of Horlick's Malted Milk in India

3490. N V S R, Pongalur.—For tin boxes enquire of Gajanand Ram Pratap, 6, Halsi Bagan Road, Calcutta

3491. G R N, Indore—China grass is a vegetable product. It is available in bundles of dry grass

3497. S V C, Vizianagram City—The following are cabinet makers of Calcutta (1) Adam Sajan & Co, 7, Bow Bazar Street, (2) N Banerjee & Co, 128½, Bow Bazar Street, (3) K L Bose & Co, 58, Bow Bazar Street and (4) Choudhury Burdhan & Co, 49, Bow Bazar Street. Wants to be introduced to Duck brand oil-cloth dealers. Ovaltine is stocked by all chemists of India

3498 K A M, Srinagar—Curno House, 17½, Chowringhee, Calcutta deals in curios. Karsondas Ludha, Vadgadi, Samuel Street, Bombay deals in saffron. To communicate with any querist write him with number and initials under care of **Industry** when your letter will be duly redirected.

3499 T Ogapoe Johnson & Co, 10, George Street, Free Town, Sierra Leone, British West Africa.—Be more explicit. We cannot understand your query

3500 G V C, Narasapur—Process of preparing artificial gold appeared in July 1923 issue. Perfumes may be bought of Sikri & Co, Post Box No 2287 and Paradise Perfumery House, 75, Colootola Street; both of Calcutta. Your other enquiries are engaging our attention

3501. L B. P B L, Almora—German colours may be bought of Amin Chand Mehra & Sons, 34, Armenian Street and Hansraj Vishram, 13, David Joseph Lane, both of Calcutta. For pocket batteries enquire of K G Maniar 55½, Canning Street and The Union Trading Co., 166, Harrison Road; both of Calcutta. For glass sheets and picture frames enquire of Adamjee Abdulali & Sons, Bunder Road and Telani Bro., 54, New Cloth Market, Bunder Road; both of Karachi. For jewellery necklaces enquire of Thakurlal Hiralal, Mer-

cantile Bldg., Lall Bazar Street, Calcutta. Buttons may be had of East India Button Co., 34, Ganaktuly Philkhana, Dacca; Imperial Horn Works, 8, Old Court House Corner, Calcutta; Tirhoot Moon Button Factory, Sahebganj Mehshi, Champaran and Narayan Button Works, Narendia, Dacca. Other addresses you want will be found elsewhere in these columns.

3502. B. N., Gohana—Process of preparing caustic lye for soap appeared in February 1924 issue. The measure quoted by you denotes the strength of soap lye measured by Twaddles hydrometer

3503 J C S, Calcutta—Recipes you require appear regularly in the pages of **Industry**. All the recipes cannot be found in one book only. As you are a Calcutta man it is advisable for you to go to local book sellers and buy books after going through them. For this purpose you may enquire of Chakraverty Chatterjee & Co, Ltd, 15, College Square and Thacker Spink & Co, 3, Esplanade East, both of Calcutta

3504 M V S M A S, Cuddapah—Gobind Ram Doulat Ram of Multan and Dum Chand Amar Nath, Ghose Mandi of Ludhiana, deal in indigo

3505 P S R, Nagaram—Zinc may be bought of Bahner Lawrie & Co, 103, Clive Street, Calcutta

3506 V M S S, Sattur—You should read books on the subjects mentioned by you. You may enquire of Chakraverty Chatterjee & Co, Ltd, 15, College Square and Thacker Spink & Co, 3, Esplanade East; both of Calcutta. Also hints appear from time to time in the columns of **Industry**.

3507 T S B S, Burhar—Spices may be had of Madhab Chandra Daw, 4, Armenian Street and Banshidhar Dutt & Sons, 126, Kheirgraputty; both of Calcutta. Salt may be supplied by Kassim & Ismail, 21, Amratola Lane, Calcutta. Wants to buy tobacco. Address of Dr. Kushan is not known

3509 K. C L, Khurda.—Your letters have already been replied by post

3510. R. D. K, Hinganghat.—Yes, you may start a chemist and druggist shop. It is a profitable business no doubt; but success will

depend upon business efficiency and power of organisation. You may start the business with Rs. 1,000 to 5,000. For addresses of the sole agents of foreign firms write direct to the parties. German herbs and patent medicines may be had of Martin & Harris, 8, Waterloo Street and Gumbhir & Sircar, 10, Sukeas Lane, both of Calcutta. Surgical instruments may be had of B. K. Paul & Co., 113, Bonfields Lane, Calcutta.

3519 K. B., Faizpur—You may use turmeric with lime so that red colour may be produced.

3512. S. P. S., Kandy—Process of curing and flavouring tobacco appeared in August 1926 issue. An article on cigar and cigarette manufacture appeared in the 11th Volume of **Industry**.

3513 T. K., Madras—For fibre extraction machines enquire of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

3515 E. T. C., Rannad—For translating German language into English you have to read German books. For this purpose, you may go through Hugo's Series, that may be had of Thacker Spink & Co., 3, Esplanade East, Calcutta.

3516 N. G. N., Ahmedabad—Consult a physician.

3517 G. S., Gujarkhan—For printed tin boxes write to Indian Colour Printing & Hollow Wares Ltd., 243, Upper Circular Road, Calcutta.

3519 V. N. W., Benares—An article on firework manufacture appeared in September 1926 issue. If you want more information you should read books on the subject that may be had of Chakraverty Chatterjee & Co. Ltd., 15, College Square and Thacker Spink & Co., 3, Esplanade East, both of Calcutta.

3520 B. N., Salkot—Cream separators, may be had of Indo-German Trading Co., 24, Strand Road; W. Leslie & Co., 19, Chowringhee Road; Edward Kewenters Ltd., 64, Lindsay Street; Indo-Swiss Trading Co., 27 Pollock Street and The Swedish Trading & Engineering Co., 13/3 Old Court House Street, all of Calcutta. You may utilize the milk in manufacturing milk powder, process of which appeared in September 1926 issue.

3523. U. C. M., Dacca—For books on lac propagation and industry write to the Superintendent, Government of India, Central Publication Depot, 8 Hastings Street, Calcutta.

3524. B. T., Ye-U—Process of preparing face power appeared in September 1924 issue. A recipe of face cream will be found in July 1924 issue.

3525 S. R. K., Kafachi—An article on biscuit making appeared in February 1925 issue of **Industry**.

3526 A. N. V., Madura—For zinc plates and copper plates write to Calcutta Photographic Stores & Agency Co., 154, Dharamtala Street and S. C. Dutt & B. K. Dutt, 100 Durga

Charan Mitter Street; both of Calcutta. Picture frames may be supplied by F. Wehner, Ritterstrasse 75, Berlin S. W.; Gost Haus, G. m. b. H., Sophienstrasse 14, Berlin C and Gensichen & Co., Dresdenerstrasse 97, Berlin S.; all of Germany. For stove enamels write to Krummner Glaswerke, Bruder Porak, Krumlov Czechoslovakia.

3530 G. S. R., Trivandrum—You may start electroplating business. An article on electroplating appeared in November 1923 issue. For equipments write to T. E. Thomson & Co., 9, Esplanade East, Calcutta who will supply you with estimates and cost. Process of preparing sugar candy appeared in October 1926 issue.

3531 N. C. R., Rawalpindi—We do not deal in any article, we only supply information to our constituents. Goldsmith's tools may be had of A. J. Soor, Bagh Bazar, Calcutta.

3532 F. S. S., Madura—For match boxes and sticks wood is needed. Try to secure wood locally. Any wood of straight fibre will be suitable for match manufacture. For match machine enquire of Bhawan Engineering & Trading Co., 122/1, Upper Circular Road and Bengal Small Industries Co., 91, Durga Charan Mitter Street, both of Calcutta.

3533 J. P. S., Palamanu—For gypsum enquire of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

3535 I. P. E. C., Madras—Your query being in the nature of an advertisement should not be published in these columns. You better try Sale and Exchange pages of **Industry**.

3540 S. V. N., Madanapalle—Consult a mechanical engineer on the comparative merits of various kinds of engines.

3541 S. C., Cawnpore—Fororris root powder enquire of Jadu Nath Ghar, Hukkapatty, Barabazar, Calcutta.

3542 M. M. B., Bombay—You may correspond with C. C. Biswas, 125, Bow Bazar Street and P. Mukherjee, 29/32, College Street Market, both of Calcutta, for selling Turkey red oil.

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Apply For Agency & Wholesale Terms.

3543 W. F. C., Padalsa—The recipes referred to by you are complete. You need not add any colour to them. If you wish you may procure aniline colour from the market and sell them as ink powder after crushing and packing them. As for example, you may procure nigrosine for black ink, eosin for red ink and sell them in the market as ink powders after pounding. Chemicals may be bought of C. C. Biswas, 125, Bow Bazar Street and B. K. Paul & Co., 1/3, Bonfields Lane, both of Calcutta. Aniline colours may be had of Anur Chaud Mehta & Sons, 34, Annemian Street, Calcutta.

3545 M. D. H., Mahomedabad—For the stamp enquire of Rae & Co., 6A, Madge Road, Calcutta. For parts of machines you may write to Dutt's Engineering Works, 12, Mutari Fuku Road, Manicktala, Calcutta. For books on tanning and agriculture enquire of Thacker Spink & Co., 3, Esplanade East and Chakraverty Chatterjee & Co., Ltd., 15, College Square; both of Calcutta.

3546 G. V. C. M., Gengavalli—For books on poultry keeping you may go through Poultry Keeping in India by Isa Tweed to be had of Thacker Spink & Co., 3, Esplanade East, Calcutta. Wants addresses of poultry farms in Madras Presidency.

3547 S. A. A., Kilanlal Port—You may start ink, pill making and soap industries with Rs. 500/- to Rs. 1000/- as initial capital. For chemicals refer to No. 3513 above.

3548 S. K. G., Chandausi—For making hair soft and smooth you may use Jabakusum, Kesaranian or Kamnia oils available in the market. As regards curling hairs you may use German Hair Curler imported by Calcutta Store, 7/1, Tagore Castle Street, Calcutta.

3550 A. C. M., Namital—Indian Directory published by Thacker Spink & Co., 3, Esplanade East, Calcutta will serve your purpose.

3551 S. T. M., Bundi State—Refer your query to Trade Commissioner for America, Grosvenor House, 21, Old Court House Street, Calcutta.

3552 C. C. B., Calcutta—Refer your query regarding poultry farm to the Superintendent, Government Poultry Farm, Etah, Lucknow. First of all cut the tree then pour a little nitric acid to the root.

3554 C. V. A. R., Allu—A recipe of tooth powder appeared in March 1927 issue. As far as we know there is no drawback in the formula of artificial slate published in January 1923 issue. A recipe of scorpion bite cure will be found in June 1924 issue.

3555 V. N., Madras—Chari & Co., Ltd. is still working. The Calcutta address is 5, Mission Row.

3556 B. L., Almora—You may learn tailoring at Calcutta Commercial Institute College Street Market, Calcutta. Passing Show Cigarette may be had of Imperial Tobacco Co., Ltd., 5, Fairlie Place, Calcutta. Electric pocket lamps may be bought of Gajanana F. S. Calvaskar, Mapuca, Goa. German novelties

may be supplied by B. G. Maniar, 55/1, Canning Street, and The Union Trading Co., 160, Harrison Road; both of Calcutta.

3558 R. U. J., Partabgarh—It will be suitable for you to take local agency for motor cars from the following parties of Calcutta: French Motor Car Co., Ltd., 234/3, Lower Circular Road, W. Leslie & Co., 19, Chowringhee; Stuart & Co., Ltd., 3, Mangoe Lane; G. McKenzie & Co., Ltd., 18, Park Street, M. T. Ltd., 59/60, Chowringhee; Great Indian Motor Works, 25/29, Park Street, Ford Motors Ltd., 110/1, Russa Road, A. Milton & Co., Ltd., 150, Dharanatala Street, Allenberry & Co., Ltd., 24, Park Street and Breakwell & Co., 44, Free School Street. For patent machines enquire of Martin & Harris, 8, Waterloo Street, Calcutta. Wants to be put in touch with dealers in madar fibre and broken Chinaware.

3559 P. K. C., Bombay—Rubber may be had of East India Rubber Exchange Co., Sandhurst Road and G. M. Shah & Co., 25, Samuel Street, both of Bombay.

3560 R. S. B. S., Boha—Your enquiry is unintelligible.

3561 D. K. D. B., Sursi—For enlarging photos write to Campbell Studio, New York; Hall's Studio, New York and Pach Photo Co., New York, all of U. S. A.

3561 K. G., Madras—Pencils and penholders are manufactured by P. N. Gupta, 12, Bellaghata Road, Calcutta. Sporting goods may be had of Continental Sports Co., 20, Chowringhee, Calcutta, Uheron Ltd., 8, Esplanade East, Calcutta, Carr & Mahalanobis, 3/D, Chowringhee, Calcutta, G. B. Birla & Sons, Sialkot City.

3568 J. M., Mizakachi—You may subscribe The British Trade Review, 13115/117, Cameron Street, London; F. C. I., Commercial America published by the Philadelphia Commercial Museum, 34th Street, Below Spruce, Philadelphia, U. S. A. and Uheron Post, 19, Solomonsstrasse, Leipzig, Germany. For tricycles enquire of Dutt Das & Co., Mercantile Bldg., Lall Bazar, Calcutta.

3569 S. N. S., Chapra—For the dictionary required enquire of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

3570 L. P., Patna—For inserting advertisement in papers of Calcutta and U. P. write to Calcutta Advertising Agency, 15 College Square, Calcutta who will supply you with the list of newspapers.

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BIRTH CONTROL CENTRE,
29-1, Telipara Lane, P.O. Shambazar, Calcutta.

3571. S V K, Proddatur.—Refer to No. 3401. above.

3572 M. A, Nagore—If you go through the pages of **Industry** regularly you will get useful hints for starting many profitable home industries. Two articles on dyeing appeared in August and September 1925 issues of **Industry**. For preparing hair oil you may go through the booklet *Hair Oil Manufacture* published by this Office.

3573 K I. A P, Bombay.—Button and nib making machines may be had of Bengal Small Industries Co, 91, Durga Charan Mitter Street, Calcutta.

3574. M. R Z, Ellore.—All the ingredients you require may be had of Jadu Nath Ghar, Hukkapatty, Barabazar, Calcutta. Process of preparing tartaric acid will appear in an early issue. Urdu equivalents are Chhara, Cahara, Cehara etc. Urdu equivalents of other ingredients are not known.

3575 B T. C, Larkana.—For spare time work you may go through the New Idea Columns of **Industry**. For soap manufacture you may go through January 1926 issue of **Industry**. Soap making materials may be supplied by C. G. Biswas, 125, Bow Bazar Street, Calcutta.

3576 T M C, Chittoor.—For paint grinding and powder mixing machine enquire of Jessop & Co, 93, Clive Street, Calcutta. For water bath mixer for soap write to T E. Thomson & Co, 9, Esplanade East, Calcutta.

3577 G B B, Nagpur City.—An article on Tobacco Products including snuff appeared in November 1924 issue.

3578 K P S, Aurangabad.—Refer your query regarding cinema business to J F Madan & Co, 5, Dharamtala Street, Calcutta who will supply you with estimate, cost of machine, dynamo, etc.

3582 H S I J, Kharagpur.—For laundry machines enquire of Symington Cox & Co, Mercantile Bldg, Lall Bazar, Calcutta.

3583 G V H N, Robertsonpet.—Sewing are button factories of Rome, Italy (1) De Nicola Alberto, V Vittoria 71/72, (2) Facetti Fratelli, V Michelangelo Caltani 4/5, and (3) Giani Gior, C Umegto 181.

3584 R M K, Mercara.—An article on Rose Water manufacture appeared in April, 1925 issue. Gunny bags may be supplied by Bird & Co, Chartered Bank Bldg, Clive Street,

Calcutta. For softening skins you may vaseline rubbing repeatedly over the skin.

3585 H. S, Bahraich.—For cardboard boxes, blocks, printing, etc, write to Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta.

3588 B. R C M, Nainpur.—Dentiphone is still in its experimental stages and has not been put in the market.

3589. I. A, Nagpur City.—Your query is unintelligible.

3590 A M. C, Mangalore.—At first experiment with a little quantity of washing soda and water. You may also try with washing powder formula of which appears elsewhere in this issue.

3593 R K F, Mogak.—Formula of a cheap washing soap appears elsewhere in this issue.

3594 A P S, Saharanpur.—Glass bottles may be had of Nani Glass Work, Nani, Allahabad, U P. Wants to be put in touch with oil dealers of U P and the Punjab.

3595 L S R, Negapatam.—You may consult Soap Making by Watt to be had of Chackraverty Chatterjee & Co, Ltd, 15, College Square, Calcutta. For other books enquire of the above firm.

3596 R S I, Draman.—For preserving lemon juice agitate a prolonged time with finest powdered talcum, filter, add sugar, boil and then fill hot into bottles and seal while still hot. Wants to be introduced to dealers in Haldhals.

3597 T A, Kandbha.—Refer to No. 2758 in January issue.

3598 N T C, Muzaffarnagar.—For books on tailoring and journals on the same write to Thacker Spink & Co, 3, Esplanade East, Calcutta.

3600 S B A, Rambennur.—Sunlight Soap may be bought of M. Framroze & Co, 9, Bank Street, Fort, Bombay. Wants to be put in touch with note book merchants of Madras.

3601 D K, Anantapur.—Oil engines may be had of Heatly & Graham Ltd, 6, Waterloo Street, Calcutta. Dynamos may be supplied by Jessop & Co, 95, Clive Street, Calcutta. For cinema machines and films write to J F Madan & Co, Ltd, 5, Dharamtala Street, Calcutta.

3602 S V, Kopya.—Violins and other musical instruments may be supplied by Oscar Adler & Co, Marknenkirchen 537/538, Gernany; C. A Wunderlich, Siebenbrunn 82, Marknenkirchen, Germany; Dolnet Mantes, France, Frette et Schaeffer, Mantes, France; De Santis cen Giovanni P dei Caprettari, 70, Rome, Italy; U Negretti, V Due Macelli 102, Rome, Italy; Barnes & Mullins, 3, Rathbone Place, London W 1 and Edwards Charles & Sons, 41, Cowcross Street, London E C 1.

3603 A M S, Tippera.—A formula of cheap washing soap will be found elsewhere in this issue.

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Manager, THE EASTERN PHOTO STORES, Negapatam.

3604. M. I. P., Ahmedabad.—Process of removing rust from iron appeared in January 1924 issue.

3605. B. N. Rohtak.—To measure strength of soda lye use Baumes hydrometer that may be had of Scientific Instrument Co., Ltd., Johnstonganj, Allahabad. In preparing the lye add water to the caustic soda so that the required strength is attained.

3606. M. S. Y., Pegu.—Zinc sheet may be had of Balmer Lawrie & Co., 103, Clive Street, Calcutta and K. D. Chatterjee & Co., 15, Raja Woodmunt Street, Calcutta.

3607. M. M., Shimpur.—Stationery and novelty may be had of A. C. Mukherjee & Co., 39, Canning Street; Bengal Stationery Store, 40 Canning Street and K. B. Nan, 233, Old China Bazar Street; all of Calcutta.

3608. S. N. K., Amritsar.—For list of newspapers to put advertisement apply to Calcutta Advertising Agency, 15, College Square, Calcutta.

3609. C. C. P. S. E. A. K., Madras.—You may study commercial subjects in Government College of Commerce, Bombay and Government Commercial Institute, Bow Babar Street, Calcutta.

3610. P. C. N., Allahabad.—It is not possible to patch enamels. Thank you for your valuable information. The address of Messrs J. N. Opal & Co., is Hansraj Street, Rawalpindi.

3613. P. A. M., Vanyanibadi.—An article on incandescent gas mantle appeared in February, 1922 issue.

3614. J. R. S., Madura.—Assafoetida may be supplied by S. S. Bathia & Co., Peshawar City, N. W. F. P. Wants to be put in touch with manufacturers of modi-Dawals.

3617. R. C. P., Gorakhpur.—For oil engines and other machines write to Heatly & Gresham Ltd., 6, Waterloo Street; Bunn & Co., Council House Street and Jessop & Co., 95, Clive Street, all of Calcutta. You may correspond with the following service securing agencies: Bharat Service Securing Co., Agra and Kapoor & Co., Fatehpuri Road, Delhi.

3618. U. B., Vizianagaram.—Merry-go-rounds may be prepared per order by Jessop & Co., 9, Clive Street, Calcutta and Martin & Co., 617, Clive Row, Calcutta. For cinematograph films enquire of J. F. Madan & Co., 5, Dharamtala Street, Calcutta.

3619. C. P. S., Siwan.—No such institute is known to us.

3620. T. C. J., Meerut.—Pill making machines may be had of Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

3622. S. C. G., Gwalior.—Molasses (date palm) may be had of Lalit Krishna Ghosh, 267, Upper Chitpur Road, Shova Bazar, Calcutta.

3623. T. M. J., Kottayam.—Following are some of the insurance companies of Calcutta: Sun Insurance Office Ltd., 2 Hare Street; The South British Insurance Co., Ltd., 315, Clive

Street, and Royal Exchange Assurance, 112, Old Court House Corner.

3624. K. P. S., Jubbulpore.—Process of bleaching bees wax appeared in May 1926 issue.

3625. S. M. S., Sibsagar.—Wants to be introduced to parties of Bofibay and Madras interested in Assam Muga Silk.

3627. B. B. G., Calcutta.—For match sticks and veneers enquire of Bhawani Engineering & Trading Co., 1221, Upper Circular Road; Sunderban Match Works; 12, Dalhousie Square and Bandemataram Match Factory; Tallygunge; all of Calcutta.

3628. B. D., Jagraon.—Sugar making machines may be had of Burn & Co., Council House Street, Calcutta.

3630. T. H. B., Hohri.—Tin cans are manufactured by Gajanan Ramprotap, 6, Halsi Bagan Road, Calcutta.

3631. P. L. B., Ambala.—Soap mould may be had of P. Mukherjee, 2932, College Street Market, Calcutta. Soap stamping machines may be supplied by Oriental Machinery Supply Agency Ltd., 201, Lall Bazar Street, Calcutta.

3632. A. M. A. J., Dolosbage.—Refer your query to the Consul-General for Germany, 2 Store Road, Ballygunge, Calcutta.

3633. J. M. P. F., Ganjam.—Wishes to be put in touch with the Ayurvedic physicians of Ceylon and Upper Burma also desires to be introduced to pure musk dealers of Assam.

3634. T. A., Calcutta.—Rubber stamp making outfits may be supplied by S. C. Dutt & B. K. Dutt, 100, Durga Charan Mitter Street, Calcutta. A formula of rubber stamp ink appeared in July 1923 issue.

3635. R. J. G., Calcutta.—Two articles on vitamin appeared in the last January and February issues of **Industry**. For further information on the subject consult a chemist.

3636. E. M. N., Pilibhit.—A formula of vanishing colour will be found in September 1926 issue.

3637. B. A. H., Ujjain.—You may learn homeopathy by correspondence through the following institutes: The Calcutta School of Homeopathy, 265, Upper Circular Road, Calcutta; C. H. Medical College 104 Cornwallis Street, Calcutta; The Hahnemann Medical College, 2811/2817, Cottage Grave Avenue, Chicago; The Hahnemann Medical College 222/226, North Board Street, Philadelphia and the London Homeopathic Hospital, Queen Square, Bloomsbury, London W. C. 1.

3638. R. T. C., Negapatam.—Recipes of Eau-de Cologne will be found in September 1924 issues. Other formulas you require will appear in an early issue.

3639. M. V. C. K., Cochin.—Turner Morrison & Co., 4, Council House Street; Shalimar Rope Works Ltd, Shalimar and W. H. Harton & Co., 8, Canning Street; all of Calcutta deal in ropes and coir.

3640. B. T. N., Shimoga.—For organizing any kind of lottery you have to take permission from local Government. You may use

Saccharine instead of sugar. For books on Astrology write to All-India Astrological & Astronomical Society, 370, Upper Chitpore Road, Jorasanko, Calcutta. Teddy cameras are intended for amateur photographers and not for professional ones. A formula of fountain pen ink appeared in August 1925 issue.

3641 H. V. D., Karachi.—A formula of sewing machine appeared in October 1925 issue. Embossing machines may be had of P. Barooah 36, Chittaranjan Avenue, Calcutta. All the ingredients referred to by you may be bought of Kailash Ch. Dutt, 16, Bonfields Lane, Calcutta.

3643. B. L. J., Hoshangabad.—Process of bleaching hand-loom clothes appeared in November 1921 issue. For yarn doubling and cloth folding machines enquire of Textile Machinery Supply Co., 61, Apollo Street, Fort, Bombay. Process of preparing anila oil will be found in March 1926 issue of **Industry** under the caption of Preparation of Essential Oil. Wants to be put in touch with dealers in yarn made of flax and Madras made wheeled shuttles of shisham wood.

3644. D. P. G., Anjar.—Mag sulph may be had of Bengal Chemical & Pharmaceutical Works Ltd., 13, College Square and B. K. Paul & Co., 113, Bonfields Lane, both of Calcutta. For dolomite and magnesite enquire of Calcutta Mineral Supply Agency, 31, Jackson Lane, Calcutta.

3645 L. R., Muzaffarnagar.—Kasturi is musk. It may be had of Himalayan Stores, Kasauli. Experience will show which musk is genuine and which is artificial.

3646 N. R. B., Raipur.—You may join Government School of Handicrafts, Nagpur for learning carpentry.

3647. L. B., Latur.—For starting business with small capital go through Small Trades & Recipes Columns of **Industry** where you will find many useful hints. Addresses of cycle importers will be found elsewhere in these columns. Sewing machines may be supplied by Indo-German Trading Co., 24, Strand Road, Calcutta; Singer Sewing Machine Co., Esplanade Mansion, Calcutta; Pfaff Sewing Machine Agency, Bombay Bazar, Camp Karachi and Tolaram Ramdass & Co., Near Denso Hall, Karachi. Type-writers may be bought of G. Rogers & Co., Norton Bldg., Lall Bazar, Calcutta. You may send your brother to Bengal Technical Institute, Jadavpur, Near Calcutta; Bengal Engineering College, Shibpur, Howrah or Benares Hindu University, Benares for studying mechanical engineering.

3650 G. D. G., Dhulia.—Your enquiries have already been replied. See elsewhere in these columns.

3652 T. S. S., Farrukhabad.—It will be advisable for you to approach some trade mark registration agents. For this purpose you may correspond with P. Lodge & Co., Post Box No. 6772, Morris & Co., Post Box No. 377 and Alum & Co., 9315, Collins Street; all of Calcutta.

3653. P. A. S., Tanjore.—An article on biscuit making appeared in February 1925 issue. You may go through Soap Making by Watt & Co. be had of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

3654 C. D. S., Cuddalore.—For distilling apparatus enquire of P. Mukherjee & Co., 29132, College Street Market, Calcutta.

3655 G. V. K., Theruvalla.—Pill making machines may be supplied by P. N. Dutt & Co., 43 Musjidbari Street and Oriental Machinery Supply Agency Ltd., 2011 Lall Bazar Street; both of Calcutta.

3657. K. N. R., Bombay.—Rancidity of ghee may be removed by boiling some lemon leaves in the ghee to be clarified.

3658 A. K. B., Renala.—An article on ceramic industry appeared in July 1925 issue of **Industry** where process of colouring pottery was discussed. As regards starting an industry say which industry will suit your locality when we shall be able to show its merits and demerits.

3660 P. S., Manglabag.—For watering the field to be cultivated from an adjacent tank as mentioned by you use water pumps. These may be had of Worthington Simpson Ltd., 10, Chive Street, Burn & Co., Ltd., Howrah and T. E. Thomson & Co., 9, Esplanade East; all of Calcutta.

3661 J. L. Z., Benares City.—For yarns of required description enquire of Dumbur Mills Ltd., Post Box No. 121, Calcutta; Ratilal Bhukhabhai, Girgaon, Bombay and Jotindra Mohan Paul & Brojendra Mohan, Paul, 192, Cross Street, Calcutta. There is no book on the subjects mentioned by you. Articles on the subject appeared in the columns of **Industry**. An article on button making appeared in April 1922 issue. Wants addresses of merchant of celluloid xenoid and corozo nuts.

3663 P. B. I., Jalgaon.—Tablet making machines may be supplied by Oriental Machinery Supply Agency Ltd., 2011, Lall Bazar Street, Calcutta.

3664 L. R. W., Parbhani.—Derby lottery tickets are issued only to Calcutta Turf Club, 13, Russel Street, Calcutta. For Particulars write to the Secretary.

3666 R. C. B., Multan City.—You may go through Engineering Production, published by Iliff & Sons Ltd., Dorset House, Tudor Street, London E. C. 4.

3667. T. C. S., Pwinleyu.—Cycle accessories may be had of Wellington Cycle and Motor Co., 313, Hornby Road, Fort Bombay. Wants to be put in touch with silk turban dealers and Singer Sewing Machine parts merchants of Bombay.

3668 N. S., Pindigeh.—You may go through Commercial Products of India by Sir George Watt to be had of Chakraverty Chatterjee & Co., Ltd., 15, College Square, Calcutta.

3669. A. S. A., Gujrat.—White oil is injurious to hair. Recipes of face cream will be found in January 1926 issue. White oil may

be supplied by Ananth Nath Dey, 3, Moidapatty, Barra Bazar, Calcutta. Pictorial magazines may be bought of Thacker Spink & Co., 3, Esplanade East, Calcutta. Scents may be had of Sikra & Co., Post Box 214, Calcutta. Wants to be a compounder in a medical pharmacy in Calcutta.

3671 G R N, Salem—Reply to your queries appeared in September 1926 issue under Brief Queries & Replies columns under No 1732

3672. T S, Rangoon—Watches are manufactured by Nivia Watch Co., Viatte & Guem, Bienot Madretsch; Elm Watch Co., Marchand Monnier & Cie, S A Bienne, Weber & Fluch, Soleure; all of Switzerland. For optical goods write to Willy Koppen, Rathenow, Germany.

3673 E V U B, Travancore—Following are prominent paper mills of India, Titagarh Paper Mills, Chartered Bank Bldg., Calcutta; Bengal Paper Mills Co., 103, Chive Street, Calcutta; Upper India Couper Paper Mills Co., Ltd., Badshahnagar, Lucknow, India Paper Pulp Co., Ltd., 8, Chive Street, Calcutta and Deccan Paper Mills Co., Ltd., 651, Bhawan Pett, Poona. Paper may be supplied by Boothley Archer Samuel, 11, Queen Victoria Street, London E. C. 4 and Harrison George, 33 & 35, East Cheap, London E. C. 3. Fountain pens and inks may be had of Nilmoney Halder & Sons, 106, Radha Bazar Street, Calcutta. Pebbles for spectacles may be bought of R M Krishna Swamy Chetty, Tanjore and Stephen & Co., 285, Bow Bazar Street, Calcutta. For rolled gold articles enquire of K G Mania, 551, Canning Street, Calcutta. Imitation stones may be supplied by Unalal Nandlal Kshetry, 38, Mugapatty, Barra Bazar, Calcutta.

3674 A K B, Darbhanga—Read the first part of instruction with (d) then proceed as directed.

3675 J E, Calcutta—A formula of Copal varnish appears elsewhere in this issue. The following formula is a good Japan black for metal surfaces. At first fuse by heat 12 ounces of amber and 2 ounces of asphaltum and finally add $\frac{1}{2}$ pint boiled oil and 2 ounces of rosin. When cooling down 16 ounces of oil of turpentine should be added.

3676 P. P. P., Madras—Knitting machines may be supplied by Indo-Swiss Trading Co., 27, Pollock Street and W. H. Brady & Co., 24, Strand Road; both of Calcutta. A formula of cheap washing soap appears elsewhere in this issue. An article on candle making appeared in November 1926 issue.

3677 L X H S, Goa—Wants to be put in touch with buyers of coconuts.

3678 G K, Tanga—For solidifying ghee you may apply hydrogenation process that appeared in January 1927 issue of **Industry**.

3679 S R. S. I., Tinnevely—We can not agree to your proposal.

3680 N M M, Nadiad—Cut paper of required size; then press the eyelet on it with the help of a punching machine. Dissolve ordinary gum then filter and remove the impurities. For

balances enquire of B. K. Paul & Co., 113, Bonfields Lane, Calcutta. Addresses of foreign journals will be found elsewhere in these columns. Industrial books may be had of Book Co., 41A, College Square, Calcutta.

3681 B. C., Madras—if you go through the pages of **Industry** regularly you will find many practical hints for starting small industries.

3682 B S. S., Bijapur—For labels and card-board boxes write to Calcutta Fine Art Cottage, 76, Dharamtala Street, Calcutta. Glass phials may be bought of S. K. Dey & Sons, 124 Shova Bazar Street, Calcutta.

3683 M R., Ellore—Recipes of cream chocolate and cocoa-powder will appear in an early issue. Rubber stamp making machines may be supplied by E. M. Richtford, 8 & 9, Snow Hill, London.

3684 K R D. R., Agia—For tin cans write to Anton Reiche A-G, Dresden A-27, Germany and Higashidani & Co., 17, Ichome, Kitahorie, Kamidori, Nishiku, Osaka, Japan.

3685 K S. N., Madras—Some of the formulas and recipes you require appeared in the last two volumes of **Industry**. Others have appeared in the current volume and the remaining will appear in early issues.

3686 S K M., Bombay—Your queries are of commercial nature so it is advisable for you to go through the pages of **Commercial India**, the sister journal to **Industry**. You may also go through some books on commercial subjects that may be had of D. B. Taraporewala Sons & Co., 103, Meadows Street, Fort, Bombay and Kamala Book Depot Ltd., 15, College Square, Calcutta. For abbreviating Commercial Managing Agent you should write Coml Mg Agt and not Coml M A as suggested by you.

3687 G L., Pondichery—Take legal advice. In the meantime enquire of Registrar, Joint-Stock Company, Govt. Place, Calcutta.

3688 N R P., Kanara—A formula for sugar coating pills appeared in August 1924. For the machine required you are referred to the Oriental Machinery Supply Agency, 201, Lall Bazar Street, Calcutta. Some softer kinds of compact stone which is generally used for the manufacture of slates are turned to make slate pencils. For suitable machines enquire of the above firm.

3689 M G L. R., Negapatam—There is no book on soap making published by this office. A series of articles on the subject appeared in 9th & 10th volumes. Formulas for making soap appear in every volume of **Industry**. The chemicals, colours, scents, etc., may be supplied by many of our advertisers.

3692 N V G. R., Bezwada—For plaster of paris in large quantities please enquire of Calcutta Mineral Supply Agency, 31 Jackson Lane, Calcutta.

3693 S M F., Satur—Thanks for your suggestions. Articles on the subject have appeared from time to time.

Notices and Reviews

Tea Mixture.

"Tea Mixture" is a novel preparation in which tea, milk and sugar are combined in the form of a liquid extract. Dissolved in hot water it yields good tea. It may be had of Mr. Y. D. Rajwade, Lahiya Bazar, Lashkar, C. I.

Plumpo.

Plumpo is a nerve tonic, said to be prepared from valuable flesh-forming ingredients. It is claimed to be efficacious against indigestion, emaciation, general debility and similar complaints by enriching the blood. It may be had of Plumpo Palace, Beadon Street P. O., Calcutta.

Vocal Pictures.

We have received samples of some novel post card pictures with ingenious devices for emitting sound by squeezing. These pictures will prove amusing to children and attractive to advertisers. These may be had of Sadashiva La Lada, Kolwalker Building, Ma, u, a, Goa.

Journal on Physical Culture.

"Vyayan," Raipura, Baroda. Annual subscription Rs. 5/- only.

We welcome the timely appearance of this journal on physical culture. The articles, which are illustrated, are eminently practical. It will help in building up the health of Indian youths.

Commercial Book in Hindi.

Hindi Bahu Khata Lekhan I Adhiti, published by Pandit Amba Pershad Fawar, Akil, Daulatabad, Unaut.

This is a primer of book-keeping and accountancy in Hindi. It deals with single and double entry systems which are compared with Hindi system of keeping account. There are instructions on preparing profit and loss account and balance sheet. Special accounts, such as those of joint-stock companies are also dealt with. Altogether the book is a useful compendium.

A Useful Directory.

The Punjab and N. W. F. P. Directory, 1927. Published by, Messrs Christian and Company, Ewing Road, Lahore.

In this useful publication many addresses and advertisements will be met with such as list of physicians, lawyers, taluqdars and the like. Of interest to businessmen is the long list of merchant houses in every branch of trade and industry. Besides, there are many noticeable features. Altogether it is a very serviceable directory of the Provinces.

A Commercial Museum.

For the benefit of those Indian merchants who desire to trade with Japan, the Indo-Japanese Commercial Museum has been opened at 135, Canning Street, Calcutta, where a wide range of manufactured goods are displayed.

A Khadi Exhibition.

It is announced that an All-India Khadi and Swadeshi Exhibition will be held at Hardwar from 19th March and will continue till the end of April 1927. The object is to popularise Khadi and other Swadeshi industries. Woolen, Silk and Cotton Khadi of different kinds will be exhibited. Besides, every other Swadeshi industry, art and craft will find a suitable place in the exhibition. For further particulars application may be made to The Secretary, All-India Khadi and Swadeshi Exhibition, Hardwar.

Scientific Magazines.

"Radio News" and "Amazing Stories." These are publications of the Experimenter Publishing Co., Inc. of New York, agents for whom in India are Messrs Ramsankar and Company, Kottar, S. I.

The former, as its name implies, is a magazine dealing exclusively in radio subjects, such as wireless telegraphy, broad-casting etc. The articles are helpful to amateurs who wish to build their apparatus and erect their own stations for listening in.

The latter may be described as a magazine of scientific fiction in as much as natural truths have been interwoven with romance. The stories, in which imagination is given the wildest course to run, such as in realistic description of the fourth dimension, will appeal to those scientists who are fond of novel.

Popular Books.

"Popular Magic" and "How to make it." Published by the Experimenter Publishing Co., of New York. Agents in India—Messrs Ramsankar & Co., Kottar.

In the first book under notice a series of magical tricks for the amateur and professional have been compiled from Science and Invention. The selections comprise a long and varied list and are copiously illustrated. They may be performed with the help of mechanical appliances or chemicals and are easy to learn. With the help of the second book under review one can make home furniture, sport devices, such as cabinet, cameras, and similar other things of every day use. Suggestions will be found for making hundreds of serviceable articles out of rejected oddments which are otherwise considered as waste. The details are complete and the instructions clear.

Trade Enquiries.

[To communicate with any party write him direct with name and address given below, mentioning **Industry**.]

3408. V. T. Janardon Thot Raj, Parvati-puram, Vizagapatam—Wants to be put in touch with suppliers of various kinds of **khambiras** and tobaccos used in preparing **hookah** tobacco.

3425. Md. Nuruddin Khan, Engineer, C. P. P. C. Trading Association, Mandla C. P.—Wants to be put in touch with dealers in mica and manganese.

3468. Khaskhal Singh A. S., P. O. Machhi Singwala, Via-Pakpattam Dist. Montgomery—Wants services of an expert in film industry.

3488. A. Sher & Co., Qarat Khan Street, Jullundur City—Wants to be introduced to dealers in hair, horn, hoofs, **madar** cotton, eggs, wooden toys and rugs.

3493. Arjun & Co., Rajahmundry—Wish to be put in touch with purchasers of pipe clay of white and violet colours and red ochre.

3579. H. Bhima Rao, 14, Obriay's Lane, Cottonpet, Bangalore City—Requires paper bags of various sizes from $\frac{1}{2}$ lb. to 1 lb. capacity for packing coffee powder.

3581. I. Philip, Monkonda Post, Krishna—A student trained in Government School at Cawnpore in its leather work department wants a suitable job in his line.

3583. G. V. Harikrishna Naidu, 4, Cross Road, Robertsonpet, K. G. F.—Wants to be put in touch with dealers in dates, plantain cut pieces and casenuts broken qualities.

3615. M. B. Sundaram, 71, Singanna Nair Street, Chintadripet, Madras—Desires to be put in touch with supplier of lizard skin, python and crocodile skins.

3621. B. C. Das, Harangai P. O., A. B. Ry.—Wants to be put in touch with purchasers of betel leaves, green ginger, seedless cotton, honey, orange, tamarind and various kinds of bamboos.

3648. Samples Bureau, Tinnevely Junction—Wish to be put in touch with manufacturers of ladies' hats, hand bags, cushions, pillows and seats of palm leaves.

3690. Burns Wolfe & Co., 75, Vesey Street, New York, U. S. A.—Want to represent Indian firms exporting Indian produce to U. S. A.

3691. Prof. J. P. Sinha, Rai Cháinpur, Palamau—Desires to be introduced to parties interested in buying or selling mineral mines, forests, country produce, Indian herbs, tanning bark, biri leaves, skins of tigers, bears, leopard and crocodile and feather and horn of all sorts.

3697. Ebrahim Haji Aba, 7, Abdul Rehman Street, Bombay—Wants to be put in touch with tea suppliers of Ceylon also suppliers of myrobalans, oil cakes, turmeric, tamarind and general produce.

APRIL ISSUE OF INDUSTRY

(In the Press.)

The April issue of **Industry** which will be published on the last day of the month will be a Special Number dealing with Manure Industry and Seed Treatment. Besides it will contain illustrated articles in addition to the regular features such as Formulas, Small Trades and Recipes, Queries and Replies. Any friend of our Subscribers may get a sample copy free on application to the Manager, **INDUSTRY**, Shambazar, Calcutta.

INDUSTRY.

Is a monthly Journal of Technology and Handicrafts, Science and Commerce, Agriculture and Business. The rate of subscription is as follows:—

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Industry is published at the end of every month.

Subscribers are enlisted at any time of the year but they will receive only the number from April to March comprising a complete volume for one year's subscription.

At the time of sending a V. P. P. only the current number is generally sent. The previous issues of the volume are sent per book-post on receipt of the value of the V. P. P. For particulars and Advt. rate please write to—

Manager **INDUSTRY** OFFICE,
Shambazar Calcutta

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